

STAFF WORKSHOP  
BEFORE THE  
CALIFORNIA ENERGY RESOURCES CONSERVATION  
AND DEVELOPMENT COMMISSION

In the Matter of: )  
 )  
2005 BUILDING ENERGY EFFICIENCY )  
STANDARDS PROJECT SCOPE, )  
SCHEDULE AND PLANS )  
----- )

CALIFORNIA ENERGY COMMISSION  
1516 NINTH STREET  
HEARING ROOM A  
SACRAMENTO, CALIFORNIA

MONDAY, OCTOBER 22, 2001  
10:04 A.M.

Reported by:  
James Ramos  
Contract No. 150-01-005

PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

COMMISSIONERS, ADVISORS PRESENT

Robert Pernell, Commissioner

Arthur Rosenfeld, Commissioner

John Wilson, Advisor

Rosella Shapiro, Advisor

STAFF PRESENT

William Pennington

Bryan Alcorn

Jon Leber

Elaine Hebert

Northern California Solar Energy Association

Bruce Maeda

Mazi Shirakh

ALSO PRESENT

Charles Eley

Eley Associates

Bruce A. Wilcox

Berkeley Solar Group

Mark Hydeman

Taylor Engineering

Jeff Johnson

New Buildings Institute

Mark Modera

Aeroseal

Lawrence Berkeley National Laboratory

Noah Horowitz

Natural Resources Defense Council

Robert E. Raymer

California Building Industry Association

ALSO PRESENT

Gary Farber  
California Association of Building Energy  
Consultants

Tony Pierce  
Gregg Ander  
Manuel Alvarez  
Southern California Edison Company

Daryl Hosler  
Lance DeLaura  
The Gas Company, A Sempra Energy Company

A.Y. Ahmed  
Occidental Analytical Group

Dave Springer  
Marc A. Hoeschele  
Davis Energy Group, Inc.

Patrick Eilert  
Marshall Hunt  
Steven L. Blanc  
Misti Bruceri  
Gary Fernstrom  
Pacific Gas and Electric Company

Douglas Mahone  
Nehemiah Stone  
Heschong Mahone Group

Ken Nittler  
Enercomp, Inc.

Michael G. Hodgson  
ConSol Energy Consulting

Bill Mattinson  
Sol-Data Energy Consulting  
California Association of Building Energy  
Consultants

Dave Ware  
Owens Corning

Jerry Blomberg  
Sunoptics Prismatic Skylights

ALSO PRESENT

Michael S. Day  
Beutler Heating & Air Conditioning

Steven D. Gates  
James J. Hirsch & Associates

John Hogan  
City of Seattle  
Department of Design, Construction and Land Use

Alvin S. Pak, Attorney  
Jeffer, Mangels, Butler & Marmaro, LLP

Len Zola  
Superior Radiant Insulation

Eric DeVito  
Cardinal Glass Industries

Ronald J. Akers  
Advanced Foil Systems, Inc.

Charles C. Cottrell  
North American Insulation Manufacturers  
Association

Michael Gabel  
Gabel Associates

Hasheem Akbari  
Lawrence Berkeley National Laboratory

Richard F. Welguisz  
The Trane Company

Carl Fisher  
L.K. Fisher and Associates

James Mullen  
Lennox International, Inc.

Frank A. Stanonik  
Gas Appliance Manufacturers Association, Inc.

Joshua Plaisted  
SunEarth, Inc.

## ALSO PRESENT

Bob Burt  
Insulation Contractors Association

Harold Jepsen  
The Watt Stopper

Jack Sales  
International Dark-Sky Association

Brad Remp  
California Building Officials

Marcus Roper  
AstroPower

W.H. Gorman  
Milgard Manufacturing, Inc.

PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

## I N D E X

	Page
Proceedings	1
Opening Remarks	1
William Pennington	1
Commissioner Pernell	5
Commissioner Rosenfeld	6
Workshop Overview	6
Introduction and Purpose	6
2003/2005 Standards Project Tasks and Schedule	6
Measure Information Template	14
Time Dependent Valuation	25
CEC	25
Pacific Gas and Electric Company	28
Southern California Gas and San Diego Gas and Electric	32
Questions/Comments	34
Residential	42
Envelope	42
CEC	43
PG&E	48
Owens Corning	51
Superior Radiant Insulation	54
Cardinal Glass Industries	55
Farber Energy Design	60
Hirsch & Associates	65

## I N D E X

	Page
Residential - continued	
Envelope - continued	
Web Service Company	67
City of Seattle	68
Advanced Foil Systems	68
North American Insulation Manufacturers Association	69
Questions/Comments	70
HVAC	73
CEC	73
PG&E	79
Owens Corning	83
Farber Energy Design	84
Hirsch & Associates	87
Questions/Comments	91
Afternoon Session	102
Residential - continued	102
Lighting	102
CEC	102
PG&E	104
Farber Energy Design	105
Questions/Comments	107

## I N D E X

	Page
Residential - continued	
Water Heating	108
CEC	108
PG&E	111
Southern California Gas and San Diego Gas and Electric	112
Hirsch & Associates	113
Farber Energy Design	117
Owens Corning	119
Questions/Comments	121
Nonresidential	128
Envelope	128
CEC	128
PG&E	130
City of Seattle	134
Owens Corning	140
Cardinal Glass Industries	141
Farber Energy Design	142
Questions/Comments	146
HVAC and Water Heating	155
CEC	155, 159, 164
PG&E	165
City of Seattle	169
Owens Corning	173



## I N D E X

	Page
Nonresidential - continued	
HVAC and Water Heating - continued	
Farber Energy Design	173
Hirsch & Associates	177
Questions/Comments	188
Lighting	192
CEC	192
PG&E	196
City of Seattle	198
Watt Stopper	204
Farber Energy Design	209
Questions/Comments	212
Other	
Web Service Company	218
CEC	221
PG&E	230
Southern California Gas Company and San Diego Gas and Electric	231
Hirsch & Associates	234
Southern California Edison Company	237
Cardinal Glass Industries	238
Owens Corning	241
Farber Energy Design	244
Questions/Comments	247

## I N D E X

	Page
PG&E - Title 20, AB-970	251
Additional Proposals	255
Closing Remarks	273
Adjournment	273
Reporter's Certificate	274

PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

## 1 P R O C E E D I N G S

2 10:04 a.m.

3 MR. PENNINGTON: Good morning. We are  
4 going to start up here, folks. May I have your  
5 attention, please.

6 My name is Bill Pennington. I'm the  
7 lead on the standards development for the 2005  
8 project. This is the first workshop for the  
9 2003/2005 standards. And we're going to get going  
10 here. Thank you very much for coming.

11 We're going to have Commissioners'  
12 offices join us here shortly, but we've got a very  
13 tight agenda for the day, so we're going to get  
14 going.

15 The purpose of the workshop is to go  
16 over plans for the project and to hear ideas for  
17 standards change. We have an agenda that you  
18 probably have noticed is very tight timing with  
19 allotted after people's name -- basically the  
20 agenda is organized around the comments that were  
21 submitted in writing. We asked for those comments  
22 to be provided by October 15th, and a number of  
23 people did that. And so the agenda is organized  
24 for them basically to present their comments to  
25 us.

1                   There's also places after those  
2           presenters indicated as other where we'll be  
3           taking comments from other people who didn't  
4           submit comments in writing.

5                   And in parentheses after the person's  
6           name we've indicated how many minutes we would  
7           allot to that particular item. And the person is  
8           expected to cover, you know, I don't see Gary  
9           Farber here, but, you know, he gave us reams of  
10          comments. And we gave him, you know, maybe a  
11          fourth of the time that he probably thinks is  
12          justified to tell you about them. So, if he  
13          comes, he'll have to go quickly. And basically  
14          that's true of all of the presenters.

15                  And then during the other comments, as  
16          well, we would expect to try to stay within the  
17          timeframe. Those are the allotments for the total  
18          comments. So it's going to be a tight day and we  
19          appreciate your patience with it and cooperation  
20          with it. And would appreciate you making your  
21          statements as brief as you can.

22                  If the people who have time allotted can  
23          make their presentations briefer than what's  
24          indicated, that would be appreciated.

25                  In terms of going over the agenda, we're

1       going to be talking about the schedule for the  
2       project. We'll go over the measure information  
3       template. This is a template of information that  
4       the Commission and its contractors will be  
5       developing for particular measures. And we're  
6       going to be asking people who have proposals,  
7       themselves, to also complete these templates. So  
8       we want to tell you about those.

9               And then the ideas for changes that have  
10       been presented or organized by residential first,  
11       and going through envelope, HVAC, lighting, water  
12       heating. And nonresidential envelope, HVAC and  
13       water heating, lighting. And then other, there  
14       are some other comments that are related to ideas  
15       that affect both residential and nonresidential or  
16       other than the end uses that we've commonly  
17       evaluated in the standards before. So those other  
18       items will be covered as the last part of the  
19       agenda.

20              The purpose here is to try to flesh out  
21       the ideas and to get them listed briefly, get them  
22       stated briefly. And it's really not the purpose  
23       of this meeting to debate the merits of the ideas.

24              We're going to have subsequent workshops  
25       coming up November 15th and 16th where that will

1 be the intention to talk about the merits and get  
2 into more detail on each one. So the purpose of  
3 today is to just get ideas out on the table. So  
4 try to refrain from, you know, debating or  
5 critiquing comments.

6 So, there's copies of things out in  
7 front. You should make sure you have those.  
8 There's a sign-in sheet, please sign in and attach  
9 your business card, one or the other, to the sign-  
10 in sheet.

11 People at the table, it would be  
12 preferred, if you don't already have a name tag,  
13 for you to make one.

14 For the reporter to hear you're going to  
15 need to speak into the microphones. And, you  
16 know, in the course of the day that would be easy  
17 to forget. I'll probably be reminded three or  
18 four times, myself, if things go as normal. But  
19 try to speak into the microphones. And please  
20 identify yourself the first time you speak.

21 If people from the audience want to make  
22 a comment on any particular item you can come up  
23 to the podium and we'll recognize you there.

24 So the first thing we're going to cover  
25 is the schedule, and I was going to go over that.

1       Let's dim the lights.

2                   Commissioner Parnell is with us. I'm  
3       sorry, I didn't see you. You snuck up on me.

4                   COMMISSIONER PARNELL: You were working  
5       so hard I came around the back.

6                   I just wanted to take the opportunity,  
7       Commissioner Rosenfeld is here, as well, and we  
8       serve on the Energy Efficiency Committee -- I  
9       wanted to take the opportunity to welcome everyone  
10      that's here. And it seems like we just did this,  
11      but we're now embarking upon a more comprehensive  
12      proposal.

13                  We want this process to be one that is a  
14      collaborative effort with all of the stakeholders  
15      as well as the staff. We, as Commissioners, are  
16      kind of here to listen at this point. We realize  
17      that this is a staff workshop, but we felt that it  
18      was important for us to have a presence here to  
19      let you know that this is not only stakeholders  
20      and staff, but also Commissioners are interested  
21      in this because this is of benefit to the state.

22                  And we are not looking to put any  
23      industry out of business. As a matter of fact, we  
24      want to be able to enhance the building industry,  
25      the consumers that buy the buildings and the

1 various products, as well as have a benefit to the  
2 state.

3 So I just wanted to say that. I want  
4 you to have a very successful workshop. Please  
5 don't be bashful when you're submitting your  
6 ideas. And, if Commissioner Rosenfeld would like  
7 to say anything, I will turn the rest of my time  
8 to Commissioner Rosenfeld, who has his own time,  
9 by the way.

10 (Laughter.)

11 COMMISSIONER ROSENFELD: Listen, Title  
12 24 is the most important single thing the Energy  
13 Commission does, so let's go ahead and talk about  
14 it.

15 COMMISSIONER PERNELL: Thank you, Bill.

16 MR. PENNINGTON: Sure, thank you. Okay,  
17 so just to go over the schedule for the project  
18 here a little bit. This is basically called the  
19 2003/2005 standards. There's two dates that we're  
20 identifying. That's because the 2003 date  
21 designates when we intend to adopt the standards;  
22 and the 2005 date is when we expect the standards  
23 to go into effect. So you'll see both those dates  
24 being referred to from time to time.

25 During the course of the project we're



1 starting now with measure identification.  
2 Basically this is a screening process, trying to  
3 get sort of preliminary information about ideas  
4 for change. And our contractor will be doing a  
5 report of that with the due date of November 30th.

6 Then we'll be fleshing out the measures  
7 in more detail. And basically filling in gaps  
8 that are identified during the measure  
9 identification point in time. So, we'll be  
10 getting more information about costs, about how  
11 things might be modeled, about reliability of  
12 measures, whatever. That'll be a time when we'll  
13 be collecting more information and documenting  
14 that.

15 And then there'll be a step of doing  
16 energy use analysis and modeling, where we will be  
17 defining how exactly measures will be analyzed and  
18 modeled in the computer programs. And both for  
19 doing analysis of the appropriateness of that  
20 measure to be in the standards, and also that  
21 would lead on to how those measures would be  
22 modeled for compliance once the standards are in  
23 effect.

24 After that there will be a life cycle  
25 cost report done that will basically draw from

1       those previous steps. And we expect to be  
2       producing that report at the end of March.

3               We expect to have a first draft of the  
4       standards put together by July 1st of 2002. And  
5       at that point we'll start a public process that  
6       will be focused on what's been drafted. And, you  
7       know, we'll be getting comments, basically  
8       devoting about a year's worth of time to reviewing  
9       what's been drafted prior to them being adopted  
10      July 1st of 2003.

11             So the front end of that time period  
12      will be a series of workshops. We'll probably be  
13      holding workshops every couple of months during  
14      that time period. And then the end of that period  
15      will be the rulemaking proceeding where, you know,  
16      hopefully we will have addressed comments prior to  
17      that, and narrowed differences where that's  
18      possible. And in the February 2003 time period,  
19      right in there, we'll be starting a formal  
20      rulemaking proceeding with a formal proposal and  
21      conducting that rulemaking proceeding at that  
22      point.

23             We intend to be working on the ACM  
24      manuals in a parallel path with the standards.  
25      And so, you know, just as we did in the AB-970

1 project, our goal is to work up the compliance  
2 approaches in parallel and actually adopt the ACM  
3 approval manuals in a parallel process with,  
4 again, when we get to workshops we'll be talking  
5 about the ACM rules, you know, in conjunction with  
6 the standards changes. And then going through a  
7 rulemaking proceeding related to the ACMS at the  
8 same time as for the standards.

9           Actually this schedule is showing a  
10 little bit more pessimistic possibility related to  
11 that that would have the actual rulemaking  
12 adoption trail the standards adoption by a little  
13 bit. But in reality our goal is to try to have  
14 these things going in parallel so that they will  
15 be consistent when we adopt.

16           After we adopt the standards we'll be  
17 putting together changes to the residential and  
18 nonresidential energy conservation manuals. And  
19 that's part of the project that the contractor  
20 will be contributing to. And the goal is to have  
21 that finished by January of 2004.

22           One of our intents here is to try to get  
23 the standards process completed as early as  
24 possible so that there can be a fairly lengthy  
25 time period prior to the effective date, so that

1 training can be done and we can get implementation  
2 materials out well in advance.

3 And hopefully we're expecting that  
4 utilities would be able to use those standards  
5 requirements that are adopted as a basis of their  
6 new construction-related programs to try to create  
7 a transition from the current standards to the  
8 next standards with some lead time before the  
9 effective date.

10 So, that's one of the underlying  
11 strategies here of getting these things done  
12 earlier than we normally have done in the past.

13 Also indicated on the schedule is the  
14 Commission's website. We're going to be posting  
15 documents there, and so, you know, you can hang  
16 onto this and that can be a reference for you.

17 For this fiscal year we're anticipating  
18 some workshops, the November 15th and 16th dates  
19 are firm. And we're planning to hold those  
20 workshops on those days, splitting between one day  
21 for res and one day for nonres, and overall on the  
22 second day.

23 We're also expecting to hold workshops  
24 on these subsequent dates as shown here. So,  
25 after November 15th and 16th, those are

1        approximate dates. But around those times we plan  
2        to be holding workshops.

3                    Is there a compelling question or two?  
4        Bob?

5                    MR. RAYMER: Very compelling question.  
6        Bob Raymer with CBIA. If we could go back on your  
7        project schedule, if you could just elaborate a  
8        little more on the February 12th and the March  
9        26th proposed tasks.

10                   But my question specifically is, given  
11        past practice, it's always been very desirable and  
12        almost critical that we have compliance tools and  
13        good understanding of what assumptions are going  
14        to be used in the calculations of standards for  
15        the new standards, when those standards are being  
16        developed.

17                   And it seems like this may be extremely  
18        aggressive, if not impossible for you to get it  
19        established in this timeline so that we will have  
20        access to accurate compliance tools.

21                   Now, obviously I'm not saying they need  
22        to be certified or anything like that, but just, I  
23        mean maybe it's a question for Ken. Will we have  
24        modified MICROPAS, et cetera, that we can use to  
25        kind of follow along as the contractors do the

1 life cycle cost report.

2 And, of course, that raises another  
3 question. Are they going to have the accurate  
4 tools? If you could just elaborate on that.

5 MR. PENNINGTON: Okay. Our intention is  
6 to develop the tools as we go. And to have them  
7 as early as we possibly can. And to fold in  
8 changes to modeling rules in those. And so that's  
9 part of the, you know, Ken's part of the contract  
10 team for doing that.

11 So, you know, that is our goal. We  
12 don't have, at this point, a really specific time  
13 for when we're going to have a beta version  
14 available for people to use. But our expectation  
15 is it will be early in the comment period on the  
16 standards.

17 So as we sort of iterate through  
18 workshops there will be tools that can be used to  
19 evaluate the consequences.

20 MR. RAYMER: Okay, I just wanted to  
21 raise the concern because at various times over  
22 the last at least 12 years we've run into some  
23 real hurdles in being able to supply competent  
24 commentary on proposals if we can't accurately  
25 depict it.

1                   And sometimes when things get so tight  
2           it's good to have as most precise tool as you can.  
3           So just food for thought.

4                   MR. PENNINGTON:   Okay.

5                   MR. DeLAURA:   Bill, I have a question.  
6           This is Lance DeLaura with SoCalGas.   Actually two  
7           questions.

8                   Looking at the date here of 11/30, is  
9           that the final date for any measures to be  
10          submitted?

11                  MR. PENNINGTON:   That's actually the  
12          date that we're planning to reach closure on those  
13          measures that the Energy Commission can use its  
14          resources to evaluate.

15                  And we're encouraging other people to  
16          actively develop the information for measures, and  
17          actually to stay on sort of a parallel track with  
18          the milestones for the rest of this.   So that  
19          basically we have fully developed measure  
20          identifications at, you know, a pace with how  
21          we're doing here.

22                  MR. DeLAURA:   Right.

23                  MR. PENNINGTON:   And if further  
24          information needs to be developed related to cost  
25          or cost effectiveness, that we continue.

1           The project certainly has limited  
2           resources. And so we're going to have to be  
3           careful about what's the scope that we're going to  
4           consider. And that will be an issue probably  
5           throughout the proceeding. You know, it's  
6           certainly one we see being really difficult at  
7           this point.

8           MR. DeLAURA: So I guess then the idea  
9           is that folks would have their ideas already  
10          pretty well fleshed out and in to the Commission  
11          even prior to this date, so that on 11/30 that  
12          represents the culmination of the ideas?

13          MR. PENNINGTON: Yes. We're asking for  
14          the templates to be turned in by November 5th.

15          So, --

16          MR. DeLAURA: Bill, the other question I  
17          had was relative to the TDV concept, itself.  
18          Could you tell us a little bit how it's going to  
19          follow this timetable?

20          MR. PENNINGTON: Yeah, there's an agenda  
21          item on TDV, so we'll talk about it at that point.

22          MR. DeLAURA: Okay, very good, thanks.

23          MR. PENNINGTON: Okay, thank you.

24          Charles.

25          MR. ELEY: Okay, would you put up the



1 first slide on measure information template. This  
2 is a template of information that we would like to  
3 collect on each standards change that you've got.

4 We're using it on our own team for the  
5 ideas that the Energy Commission is bringing  
6 forth. And we would like for everyone else to use  
7 it, as well, so that we've got the information in  
8 a consistent format.

9 The first topic would be just a brief  
10 description of what the change would be; the  
11 proposal is to change X, Y and Z of the ACM manual  
12 to deal with such-and-such issue. If you've got  
13 specific code language, put it there, right in the  
14 description. Maybe put it in italics or something  
15 like that.

16 But we're mainly just looking for a  
17 simple sentence, or no more than a paragraph, if  
18 possible, about what the code change is.

19 Can you kind of slide that up a little  
20 bit so that we can see the bottom of the page?

21 And then after that describe the  
22 benefits of the change or measure that you  
23 recommend; what the energy savings would be.  
24 We're also interested in electricity peak demand  
25 reduction, or in any other benefits such as

1 improved comfort or reduced maintenance costs,  
2 environmental benefits, better indoor air quality,  
3 whatever the benefits would be.

4 The next section would be a discussion  
5 of environmental impact, if any. This is kind of  
6 a legal requirement with the Energy Commission to  
7 be able to identify measures that might have a  
8 potential environmental impact.

9 Would you go to the next page, please.

10 MR. HODGSON: Charles?

11 MR. ELEY: Yes.

12 MR. HODGSON: Mike Hodgson for CBIA.

13 Real quick question on the benefits. How do we  
14 propose -- I can understand annual reductions  
15 using Title 24, how do you propose for us to  
16 propose to you peak load?

17 MR. ELEY: We're not asking for  
18 quantitative information in this template. Just  
19 say this measure would have benefits in terms of  
20 peak load reduction. Later in the process we will  
21 try to get a quantitative assessment.

22 MR. HODGSON: Is that true then for peak  
23 and any other --

24 MR. ELEY: Yeah.

25 MR. HODGSON: -- just say it will have

1       benefits --

2                   MR. ELEY:   Exactly.

3                   MR. HODGSON:  -- and list what you think  
4       they may be?

5                   MR. ELEY:   Exactly.

6                   MR. HODGSON:  Okay.

7                   MR. ELEY:   And if you have any  
8       information that would give us an order of  
9       magnitude, great.  This is not a detailed  
10      analysis.  This is just to bring it to the front  
11      so that it can be considered.

12                   The next subtopic would be to indicate  
13      the type of change that's being recommended.  Is  
14      this a mandatory measure, a prescriptive  
15      requirement.  Is it a compliance option; would it  
16      change the way buildings are modeled; or is it  
17      something else, some other.  And, you know,  
18      describe that as best you can.

19                   The next topic is measure availability  
20      and cost.  If the code change involves some new  
21      widget or technology, then indicate the maturity  
22      in the marketplace.  Is there more than one  
23      manufacturer.  What is the cost; is it widely  
24      available; is it a specialized item.

25                   This would, of course, be related to the

1 type of change. I mean if it's being recommended  
2 as a compliance option then it's less important  
3 that it be widely available in the market. But if  
4 it's being recommended as a mandatory measure,  
5 it's probably essential that it be widely  
6 available in the market and from multiple  
7 suppliers.

8 The next topic is to comment on the  
9 useful life, the persistence, and any kind of  
10 maintenance requirements that are associated with  
11 the measure. Is it expected to last for 30 years;  
12 what kinds of maintenance is going to be required  
13 to keep it working properly so that we have some  
14 confidence that the energy savings will happen  
15 over a long period of time.

16 The next topic would deal with  
17 performance verification. And this is really  
18 startup performance verification. Is there  
19 anything about this measure that would require  
20 that a technician or builder, an architect or  
21 someone follow certain procedures. Maybe  
22 commissioning procedures to verify that this  
23 measure is properly installed, and that it will  
24 achieve the savings that we expect.

25 Next page, please. The next subtopic is

1 cost effectiveness. And, again, this is just  
2 order of magnitude. If the change is a mandatory  
3 measure or a prescriptive requirement, then we  
4 have to, by law, show that it's cost effective.

5 If it's proposed as a compliance option  
6 we don't have to show that it's cost effective,  
7 but it would improve the cause if we thought it  
8 were, you know. It would be more likely to be  
9 considered.

10 The next subtopic deals with analysis  
11 tools. Is the reference method MICROPAS for  
12 residential or DOE2 for nonresidential. Is it  
13 capable of modeling this thing that we want to  
14 include in the standards. If not, what  
15 enhancements would be needed, or how would we  
16 assess the benefits of this widget or design  
17 strategy in the compliance process.

18 MR. ANDER: Charles?

19 MR. ELEY: Yes.

20 MR. ANDER: Gregg Ander, Southern  
21 California Edison. Under the analysis tools, if a  
22 DOE2, PowerDOE, MICROPAS set of algorithms can't  
23 handle a new technology, is it sort of up to the  
24 sponsoring organization to develop those  
25 algorithms? Or how would that work?

1                   MR. ELEY: Yes, it would be. But it  
2           doesn't have to be done in the screening paper.  
3           This would follow later. And, you know, there's  
4           countless ways of doing that. HVAC duct  
5           efficiency has kind of been dealt with a  
6           multipliers on SEER, you know. So there's lots of  
7           ways of doing it apart from going into the code in  
8           DOE2 or MICROPAS and making changes.

9                   But it is important and essential,  
10          really, that we have some way of assessing the  
11          benefits of measures in the compliance process.

12                   You would indicate in the next topic if  
13          this measure is related to others, if there's any  
14          strong interactions.

15                   And then the last topic is to list  
16          research papers or research studies that support  
17          consideration of this topic. And under other  
18          research, I know this is maybe a little bit  
19          confusing, but what we want to do here is ask you  
20          to identify what the next steps would be.

21                   I mean if this is to be considered as a  
22          standards change, then what do we need to do next,  
23          you know. Do we need to modify DOE2; do we need  
24          to chase down some cost data; do we need to  
25          develop new compliance forms, or whatever related.

1                   So, anyway, that's the template. The  
2                   idea here is not to place, you know, onerous  
3                   requirements on everyone. Our team is using this  
4                   template, ourselves. And it's just -- it's kind  
5                   of a checklist to make sure that all the points  
6                   are covered.

7                   Because when we come back on the 15th  
8                   and the 16th, following those meetings, you know,  
9                   we're all going to have to decide how much we can  
10                  bite off. I doubt that we're going to be able to  
11                  do everything that you guys and we're going to  
12                  bring forward today. And these screening papers  
13                  are really a tool to help us do that.

14                 MR. RAYMER: Charles.

15                 MR. ELEY: Yes.

16                 MR. RAYMER: Bob Raymer with CBIA. I'm  
17                  assuming that under measure availability and  
18                  costs, that if a particular measure was going to  
19                  require use of a third-party inspector or a  
20                  specialized inspection that not only the cost of  
21                  the inspection, but the availability of statewide  
22                  level of inspectors should also be noted.

23                 MR. ELEY: That's correct, yes.

24                 MR. RAYMER: Thanks.

25                 MR. ELEY: And you would also note that

1 under performance verification.

2 MR. HOGAN: Charles, John Hogan, City of  
3 Seattle. I have a logistical question. How do  
4 you want us to number or organize these? I  
5 presume people are going to be submitting multiple  
6 ones. Do you want them by code section or do you  
7 want them by a person's name and organization,  
8 dash, 1, 2, 3, 4, 5, or --

9 MR. ELEY: We'll work that out. This is  
10 organized, if you're familiar with Word, you know,  
11 there's heading level 1, 2, 3 and so forth. The  
12 name of the topic should be heading level 2. And  
13 then the subheads description benefits,  
14 environmental impacts should all be heading level  
15 3. It will have a higher level of organization  
16 above that, probably grouping under residential  
17 envelope measures, or residential water heating,  
18 residential lighting and so forth.

19 MR. PENNINGTON: I would suggest you use  
20 the organization that's in the agenda, so it's res  
21 and the end uses under res, and nonres, and do it  
22 that way.

23 Okay, Noah.

24 MR. HOROWITZ: Yes, Noah Horowitz with  
25 NRDC. I don't know if this goes to Charles or



1 Bill, but given the tight timeframe and the finite  
2 resources to review this huge stack you're going  
3 to have, is there an MW or Kwh target? I  
4 understand this is a bottom-up and a top-down  
5 process, but is there a certain floor we're  
6 seeking as we enter this proceeding?

7 MR. ELEY: I'll defer to Bill on that.

8 MR. PENNINGTON: No, there isn't.

9 Okay, we're going to need to move on to  
10 time dependent valuation --

11 MR. HODGSON: A quick question for  
12 Charles. Mike Hodgson, CBIA. This template would  
13 be proposing not only new ideas, but if we propose  
14 changes in format like the CF1R4s, CF6R, et  
15 cetera, that we should use this kind of template.

16 MR. ELEY: Any kind of change. It  
17 doesn't have to be to the standards, it could be  
18 to the ACM or the compliance forms --

19 MR. HODGSON: How specific do you want  
20 the change -- I mean we could make a broad change,  
21 want to change the documentation requirements.  
22 And that's pretty broad, so --

23 MR. PENNINGTON: I think the more  
24 specific you can be about, you know, if you have a  
25 particular idea and a train of thought for how to

1       implement that, that would be idea.

2               MR. HODGSON: I think we have a series  
3       of particular ideas, I don't know whether they  
4       should be on one template, or whether they should  
5       be on multiple templates.

6               MR. ELEY: I know exactly what you're  
7       talking about. I think you'll just have to kind  
8       of make that call. If you want to call me or talk  
9       about the specifics, I'm happy to --

10              MR. HODGSON: We'll give you a call,  
11       Charles.

12              MR. ELEY: -- I'm happy to discuss it  
13       with you. Steve.

14              MR. GATES: Steve Gates with Hirsch and  
15       Associates. Is this template -- you mentioned  
16       using Word headings and subheadings and what  
17       all -- is this template already available in an  
18       electronic format?

19              MR. ELEY: Yes.

20              MR. GATES: Okay.

21              MR. PENNINGTON: Yes.

22              MR. GATES: So basically use the  
23       template, use the headings that it already has?

24              MR. PENNINGTON: Yes.

25              MR. GATES: All right.

1                   MR. PENNINGTON: We'll get that to you,  
2                   Steve.

3                   Some of the people are familiar faces,  
4                   and you know, we've already had some email  
5                   dialogue with them, or communication with them.  
6                   We'll add you, anyone who wants to be active, you  
7                   know, in the project like this we'll add.

8                   Okay, let's move on to time dependent  
9                   valuation.

10                  MR. STONE: Bill, can I make a quick  
11                  suggestion on that? Maybe just put that on the  
12                  2005 standards website.

13                  MR. PENNINGTON: It is actually on the  
14                  website right now, thank you.

15                  MR. STONE: Oh, there you go.

16                  MR. PENNINGTON: Okay, briefly on time  
17                  dependent valuation. This is kind of a little bit  
18                  of an overview from the Commission's vantage  
19                  point.

20                  The purpose of time dependent valuation  
21                  is to account for the time of use of energy in the  
22                  standards. The cost of energy, whether it's  
23                  electricity or natural gas or propane varies by  
24                  hour, in particular for electricity, and by season  
25                  for essentially all fuels.

1                   And the standards now don't  
2           differentiate between the value of saving peak  
3           energy from offpeak energy, or don't differentiate  
4           between natural gas being a much more expensive  
5           commodity in the wintertime than in the  
6           summertime.

7                   And so this approach would work into the  
8           standards a way of dealing with the time  
9           dependency, so that we would be valuing the energy  
10          savings that measures have dependent on their  
11          time.

12                   And so this idea was originally brought  
13          to the Commission's attention by PG&E in 1995 and  
14          again in 1998. And each of those times the scope  
15          of the proceeding that we were working on was  
16          extremely narrow, and we didn't feel like we could  
17          address them. And so we basically told PG&E good  
18          idea, but we can't deal with it.

19                   And, again, it was raised by PG&E and  
20          also Southern California Gas Company in the AB-970  
21          project. And given that that was an emergency  
22          adoption process we didn't have time to deal with  
23          it then.

24                   But we actually heard the issue and were  
25          sensitive to it. And after the close of the 1998

1 standards process we began working with PG&E to  
2 look into what approaches would you need to have  
3 to incorporate time dependent valuation in the  
4 standards.

5 And work was begun there. We had a  
6 joint contract for the first year and did some  
7 developmental work. And PG&E has continued to  
8 pursue it and develop it more thoroughly.

9 So we have a fairly mature proposal that  
10 PG&E will be bringing forward that the Commission  
11 will be considering for inclusion. And I'm sure  
12 we'll be tinkering with it, modifying it a little  
13 bit around the edges, but in general we agree with  
14 the concepts in that proposal.

15 The idea is that we would replace the  
16 current source energy multiplier that is a  
17 constant factor of three, basically, to the side  
18 energy for electricity that are in the standards  
19 now. And instead go to an hourly varying  
20 adjustment, based on the varying costs of  
21 electricity, natural gas and propane. And so that  
22 would be the general approach we would use.

23 One of the important things to make this  
24 a viable, you know, something that could be  
25 realized, we need to be able to do both HVAC and

1       water heating modeling on an hourly basis. And so  
2       part of the evaluation that's been undertaken up  
3       to this point has been to look at to what extent  
4       are we satisfied with the hourly modeling, both  
5       for residential and nonresidential measures.

6               And there are some ideas for how to make  
7       fairly limited refinement of the nonresidential  
8       HVAC modeling, but the substantial work here is to  
9       develop an HVAC modeling approach and water  
10      heating modeling approach for residential, because  
11      those are essentially lacking in the current  
12      version of MICROPAS.

13             So there are, again, fairly mature ideas  
14      for how to do that that we will be further  
15      developing at this point.

16             Marshall.

17             MR. HUNT: Marshall Hunt, Pacific Gas  
18      and Electric Company. PG&E, in this instance, was  
19      Gary Fernstrom. I want to thank him for kicking  
20      this all off. And in the interests of time I'd  
21      like to turn this over to Doug Mahone, who is the  
22      principal in charge of our major research on this.

23             MR. MAHONE: Actually Gary Fernstrom is  
24      going to talk about the TDV. We've got a  
25      PowerPoint presentation that the guys are going to

1 switch over to.

2 MR. FERNSTROM: Thank you, Doug. I'm  
3 Gary Fernstrom from the Pacific Gas and Electric  
4 Company.

5 Commissioners, Staff, consultants,  
6 interested parties, I'd like to thank you for  
7 giving PG&E the opportunity to present some  
8 suggestions for improvements to Title 24.

9 I'm the Project Manager for the TDV  
10 project, as well as the appliance standards  
11 project. The appliance standards are not part of  
12 this discussion, but in the submittal that we  
13 provided the Energy Commission, and is available  
14 outside for reference, we've provided some  
15 information on what improvements we're proposing  
16 for appliance standards, as well.

17 So let me quickly go to TDV. In the  
18 interest of time I'm going to move through these  
19 slides rather quickly. However, first I'd like to  
20 recognize the consultants that have worked on  
21 this. The Heschong Mahone Group, Eley, Berkeley  
22 Solar Group, and E3 Energy and Environmental  
23 Economics.

24 And the funders over the three- to five-  
25 year course of this work so far, funding has been

1 provided, of course, by PG&E, by the California  
2 Energy Commission, by the Southern California  
3 Edison Company and the Southern California Gas  
4 Company.

5 So, TDV is intended to replace the flat  
6 rate energy basis that is the baseline for Title  
7 24 now with the intent of improving electric  
8 system reliability in the state by focusing the  
9 standards on reducing demand, and with the intent  
10 of reducing overall costs for the benefit of  
11 ratepayers within the state.

12 It's intended to be transparent to the  
13 end user, and by this we mean the Title 24  
14 compliance expert. It's intended to have the same  
15 stringency as the 1992 standards.

16 It will increase credit for measures  
17 that perform well on peak, and commensurately  
18 reduce credit for measures that don't perform well  
19 on peak.

20 It's intended to provide a better long-  
21 term signal to reduce system demand and costs  
22 within California.

23 May we have the next slide, please.  
24 This gives a visual representation of how this  
25 would work. The red line is the current flat



1 energy valuation that's used now.

2 The purplish-blue line is the time  
3 dependent valuation where the value of energy  
4 saved would be related to the time at which it's  
5 used.

6 And although this particular slide  
7 doesn't show it, it would similarly be related to  
8 the climate zone in which the energy is used.  
9 Because we found that transmission and  
10 distribution costs are, in fact, related to the  
11 peakingness of the climate in different climate  
12 zones throughout the state.

13 Next slide, please. This slide shows  
14 the way the costs are put together, starting with  
15 the wholesale commodity cost, the generation cost,  
16 the variable marginal transmission and  
17 distribution costs are added, and then a flat rate  
18 adder has been added to bring it up to the 19,  
19 what did I say, '93 levels -- '92 levels.

20 In addition, the environmental  
21 externalities have been added and the 1992 rate  
22 adder to bring this approach up to the level of  
23 stringency that was utilized in 1992.

24 Okay, may we have the next slide,  
25 please. Gas has been derived similarly, but some

1 of the factors that contribute are different. In  
2 this case we start with the gas commodity cost, a  
3 flat adder is added to bring it up to the current  
4 rate levels. And environmental and externality  
5 adder is added. And lastly, a small amount to  
6 bring the gas stringency up to the 1992 levels.

7 May we have the next slide, please.

8 This gives you a sense for the community and  
9 climate zone around Shasta of the contribution of  
10 these different elements to the overall structure  
11 of the time dependent factor.

12 So the 1992 adder is about a third of  
13 the overall factor. The rate adder is about 8  
14 percent. The generation cost about 34 percent.  
15 The TND cost about 21 percent. And the value of  
16 the environmental externality about 6 percent.

17 So I've moved through this quickly in  
18 the interest of time. I'd refer you to the  
19 submittal we've provided, and we'll take  
20 questions, I guess, offline. Thank you.

21 MR. PENNINGTON: Why don't we go ahead.  
22 Lance, could you go ahead and make your comments,  
23 and then we'll take questions at that point.

24 MR. DeLAURA: Basically we're very  
25 pleased to be here to talk about gas air

1 conditioning as it relates to TDV. During the AB-  
2 970 hearing process there wasn't enough time to  
3 get gas air conditioning into the standards, so  
4 we're actually quite looking forward to this next  
5 code cycle change.

6 What I'd like to do is turn this over to  
7 A.Y. Ahmed, our consultant.

8 MR. AHMED: This is A.Y. Ahmed,  
9 consultant to Southern California Gas. Basically  
10 our comments regarding TDV have been filed with  
11 the Commission on October 15th. And I'd like to  
12 suggest that everyone take a look at those  
13 comments.

14 Our basic concerns are two. Number one,  
15 the valuation of the environmental externalities,  
16 the assumptions behind those. And number two, the  
17 hourly TDV values. Our concerns are that they are  
18 not really reflecting what the consumer will  
19 actually pay as far as the utility rates and their  
20 cost of operation or the equipment. So we have  
21 expressed those concerns in our written comment on  
22 October 15th.

23 In addition, we are looking forward to  
24 the standard for natural gas cooling for both res  
25 and nonres, and we have Marc Hoeschele from the

1       Davis Energy Group here to later talk about the  
2       template that they are working on.

3               MR. HOESCHELE:   Marc Hoeschele, Davis  
4       Energy Group.  As a consultant for SoCalGas, we'll  
5       be evaluating gas cooling technologies in both the  
6       residential and nonresidential to make sure they  
7       are treated equitably under the standards.

8               MR. AHMED:   Thank you, Marc.  That's it.

9               MR. PENNINGTON:   Okay.  Gregg.

10              MR. ANDER:   Thanks, Bill.  Couple quick  
11       comments.  First of all, is the PowerPoint  
12       presentation available?

13              MR. ELEY:   It's out in the hall.

14              MR. ANDER:   The one we just saw?

15              MR. HUNT:   The PG&E PowerPoint  
16       presentation, there's a handout out in the  
17       hallway.

18              MR. ANDER:   Okay.

19              MR. FERNSTROM:   There were 75 copies out  
20       there.

21              MR. ANDER:   Okay, appreciate it.  And  
22       secondly, Bill, we've been to a number of meetings  
23       over the last year or so talking about some of the  
24       time value of energy and so forth.  There were a  
25       number of discussions in those various forums

1       about interpretation of the Warren Alquist Act and  
2       how the Commission is authorized to look at these  
3       sorts of issues.

4                Could you discuss a little bit what  
5       those issues are, or are there any issues; have  
6       you talked to, reviewed with internal counsel  
7       about what those might be.

8                MR. PENNINGTON: I'm not sure I really  
9       know what you're referring to, but --

10              MR. ANDER: Well, let me -- historically  
11       over the last couple of decades it's been  
12       principally an energy based code without the time  
13       value kind of folded into it. Now we're --

14              MR. PENNINGTON: The Warren Alquist Act  
15       requires the standards, the performance standards  
16       to be in terms of energy per square foot. And,  
17       you know, we have not in the past differentiated  
18       by time of use. But I don't see any constraint on  
19       that from the Warren Alquist Act.

20              We need to have the performance  
21       standards stated in units of energy per square  
22       foot, units. I think at this point the staff  
23       thinks that we can do that in sort of a kBtu per  
24       square foot kind of mode, very similarly to how we  
25       do now. But it wouldn't be in terms of using a

1 source multiplier, it would be using a multiplier  
2 that's based on time dependent valuation.

3 MR. FERNSTROM: Bill, Gary Fernstrom,  
4 PG&E. I'd just like to say that the state is  
5 continuing to face an electric capacity crisis.  
6 And it seems to me that regardless of what  
7 terminology we use, it's absolutely essential that  
8 the energy standards be modified in some way so as  
9 to ease the peak demand problems created through  
10 buildings within the state.

11 MR. PENNINGTON: Other questions?

12 MR. RAYMER: Yeah, Bob Raymer, CBIA.  
13 Once again I'm making the assumption that there's  
14 going to be an incorporation of TDV. And  
15 understanding that, has there already been a beta  
16 version of MICROPAS explored that does this? Or  
17 if not, how long is it going to take to get one?

18 I mean isn't this going to have a  
19 substantial impact on doing analysis?

20 MR. PENNINGTON: Yes, there's been a  
21 substantial amount of work on coming up with  
22 algorithms that would be installed into the  
23 computer programs to do TDV. And so, you know,  
24 there's been I don't know how many dollars have  
25 been spent on this already, but a substantial

1 investment has been made on working those out.

2 MR. RAYMER: Do you have a clue as to  
3 when something like that might be available?

4 MR. ELEY: Well, actually there is a  
5 special version of MICROPAS that is available,  
6 right, Doug?

7 MR. MAHONE: Yeah, as part of the PG&E  
8 project effort we've developed a prototype version  
9 of MICROPAS, which is essentially modified through  
10 a spreadsheet analysis that applies these hourly  
11 TDV values that have been calculated.

12 We're just in the process of making some  
13 final adjustments to that and we expect by the end  
14 of this month to have a working prototype for both  
15 residential and nonresidential standards so that  
16 you can play around with MICROPAS and with  
17 EnergyPro and see how the TDV values affect the  
18 outcome.

19 Those will be posted on the PG&E project  
20 website.

21 MR. PENNINGTON: John.

22 MR. WILSON: One question or comment  
23 about the time dependent valuation. We've been  
24 doing a lot of work on real time pricing this year  
25 as part of our demand response efforts. And I'm

1 not sure if TDV includes the concept of  
2 reliability adder, which is how real time pricing  
3 is done in places like Georgia Power where they,  
4 during the, you know, 25 or 50 most critical hours  
5 of the year they add a price to their normal real  
6 time price that is their system -- kind of cost,  
7 their direct cost, in order to balance supply and  
8 demand. And that reliability adder might be \$1 a  
9 kilowatt hour. And it's not based on a direct  
10 cost.

11 And when I'm looking at the TDV slides,  
12 Gary, it looks like you're doing different kind of  
13 cost allocation. And when you move from cost  
14 allocation to the economic concept of real time  
15 pricing, you're not necessarily just, you know,  
16 allocating cost to hours.

17 MR. FERNSTROM: Well, that's correct.  
18 The intention of TDV was to address the  
19 appliances, the building materials, the structure  
20 in a non demand responsive way.

21 So the economic factors are intended to  
22 influence the building, not necessarily the way  
23 the building may be operated differently from day  
24 to day.

25 MR. WILSON: We also might want to



1 include just some real demand responsive  
2 technologies in the building and/or appliance  
3 standards, in which case we might want to think  
4 about these kinds of reliability values.

5 MR. FERNSTROM: I agree with you.  
6 There's a case to be made for that. However, I  
7 believe that also has more to do with the  
8 operation of the building than it does necessarily  
9 the materials and fixtures that are installed  
10 within the building.

11 MR. WILSON: I understand. And going to  
12 Gregg's comment, I think Gregg might have been  
13 alluding to the Warren Alquist Act and the  
14 direction it gives to these standards being cost  
15 effective to consumers, and therefore we've always  
16 looked to rates as being the economic measure of  
17 benefit.

18 I think part of our hypothesis is that  
19 at some point in the not too distant future  
20 buildings will be seeing real time prices. And so  
21 therefore, doing this kind of time dependent  
22 valuation, perhaps enhanced with some kind of  
23 reliability adder, is something that consumers  
24 will ultimately see.

25 MR. ANDER: We certainly support it. I

1       just wanted to see if there were any internal  
2       discussions, you know, any obstacles you might  
3       need to overcome internally. So I'm pleased to  
4       see there apparently aren't.

5               MR. DeLAURA: Bill, Lance DeLaura again.  
6       I had a couple of calls from people outside of the  
7       immediate circle that have been involved in TDV.  
8       And I just wanted to state that generally I think  
9       there's confusion in the marketplace on TDV.

10              There are those that are closer to it  
11       that have a working understanding of TDV. There  
12       are those that are not as close that still are  
13       unclear as to whether TDV will actually be the  
14       concept that's used for measuring the standards.

15              There are those that believe that TDV is  
16       basically a done deal, if you will, subject to  
17       making refinements. There are others that say,  
18       well, there are two paths going on where the  
19       Commission is assessing the way that standards are  
20       done today, and also weighing TDV against that.

21              I'm just wondering if you could clarify  
22       that so maybe folks again on the outside that have  
23       those questions could have their questions  
24       resolved.

25              MR. PENNINGTON: Well, this is something

1       that we're considering for this next round of  
2       standards. And so in terms of it being a done  
3       deal, it's not a done deal, you know. We're  
4       beginning to look at it and we'll be studying the  
5       consequences and, you know, we think this is the  
6       approach to use.

7               But certainly there will be plenty of  
8       opportunity to discuss this and understand the  
9       consequences of it.

10              I do expect that for cost effectiveness  
11       analysis we will be looking at not only what does  
12       the cost effective look like under a TDV kind of  
13       scenario, but also under a more conventional kind  
14       of thing.

15              For AB-970 we had three scenarios for  
16       cost effectiveness analysis. And I'm imagining  
17       that we will have scenarios for this project.

18              MR. DeLAURA: Great, thanks.

19              MR. PENNINGTON: We need to be winding  
20       up here.

21              MR. FERNSTROM: As the principal  
22       proponent of TDV I'd like to concur. TDV is  
23       clearly a proposal at this time. However, it has  
24       three years work behind it. We think it's well  
25       developed and are optimistic about its ultimate

1 inclusion in Title 24.

2 MR. RAYMER: Very quick question, Bill.  
3 Bob Raymer. To Gary, you had an indicator that it  
4 was bringing up to the '92 standards. I'm missing  
5 something Y-92. Is that simply the analysis that  
6 you did back in the early '90s?

7 MR. FERNSTROM: That was a policy  
8 judgment call that we made that we should keep the  
9 energy standards stringency of the 1992 level.  
10 The TDV values that came out required escalation  
11 and increase to come up to the '92 level. We  
12 didn't judge that it was appropriate to attempt to  
13 bring them higher than that in consideration of  
14 the cost of compliance and so on.

15 MR. PENNINGTON: Okay. I think we'd  
16 like to move to the residential envelope topics.  
17 And, Charles -- or, no, Bruce Wilcox is going to  
18 present the Energy Commission's topic areas that  
19 we intend to focus on.

20 MR. WILCOX: Okay, so we have a number  
21 of topics that, as contractors for the Commission,  
22 we're developing using this template that Charles  
23 developed that we're going to be presenting as  
24 possible changes to the standard. And I'm going  
25 to go through and discuss those very briefly so

1       you kind of know where we're going and what the  
2       possibilities are.

3               First topic is residential construction  
4       quality. And this comes from a number of  
5       activities including several studies that have  
6       been done recently that look at how buildings are  
7       actually built versus the idealization of how  
8       they're built that we've been basing the standards  
9       on.

10              And we think the issues that we're going  
11      to look at here are insulation installation  
12      quality; wall framing; fireplaces and other  
13      interior cavities, particularly ones that connect  
14      to the attic; air barrier, sealing attics and  
15      draft stopping and so forth; and the number of  
16      recessed light fixtures.

17              And the general approach here would be  
18      to derate the measures that are included in the  
19      standards calculations to reflect how they're  
20      really installed and what the real performance in  
21      the field would be.

22              And then provide credits for people who  
23      want to actually go beyond normal installation  
24      quality and provide verification and so forth.

25              So that's the residential construction

1       quality area.

2               Next slide, please. Residential  
3 fenestration is another area that we're going to  
4 be looking at. One of the issues there is whether  
5 or not we should go for better U factors than are  
6 currently in the AB-970 version of the standards.  
7 And the question there is whether they're cost  
8 effective and whether the technologies are widely  
9 available and so forth.

10              The other issue here, and this is a  
11 pretty significant one for the structure of the  
12 residential standards is the question about  
13 whether we should remove the area tradeoff as part  
14 of the compliance process for most buildings.

15              The proposal is that for buildings of  
16 normal glazing areas, and the range of what that  
17 is is not at all decided, that the referenced  
18 house in the performance standards would have the  
19 same glass area as your proposed house has.

20       Rather than the way the current standards are  
21 where in climate zone 12, here where we are now,  
22 the reference house always has 16 percent of the  
23 area in glass. So if you have a larger glazing  
24 area you have to make up for that somehow and if  
25 you have a smaller glazing area you get a credit

1       for having a smaller glazing area.

2               The idea here is you'd make the glass  
3       areas equal so that partly this makes it easier to  
4       comply using the cost effective measures that all  
5       houses would do the same measures. And also the  
6       idea that prescriptive packages would become more  
7       buildable if glazing area was in a strong  
8       constraint.

9               Next slide. Multifamily buildings is an  
10       area where there's thinking that there's  
11       substantial problems with the compliance process.

12              One of them has to do with glazing area.  
13       The typical multifamily buildings have glazing  
14       areas that are much smaller than what the  
15       prescriptive standards assume. The 16 and 20  
16       percent glass areas applied to multifamily  
17       buildings as well as single family, and  
18       multifamily buildings are substantially lower  
19       glazing areas, which means that they basically  
20       don't have to do anything to comply if they just  
21       take a tradeoff on window area.

22              So, if we make this area tradeoff change  
23       then that will substantially improve the  
24       multifamily building case, we think.

25              And the second thing is there's a

1 similar kind of disconnect in water heating  
2 calculations so that people doing normal  
3 multifamily building water heating can get large  
4 credits. And we're going to talk about water  
5 heating as a separate topic in a minute here, so,  
6 go on from that.

7 Next slide, please. Replacement windows  
8 and other residential alterations. The idea here  
9 would be to expand the application of the  
10 standards to replacements in alterations in  
11 existing buildings, to require those to meet the  
12 energy standards when we can show that it's cost  
13 effective and so forth to do that.

14 And the primary areas are windows,  
15 potentially HVAC system replacements, duct  
16 replacements and modifications and potentially  
17 some envelope changes as well.

18 So we'd be looking at whether those  
19 things were cost effective, whether you could  
20 reliably require that they meet some kind of  
21 standard or not.

22 Next slide. There's a couple slides  
23 here on residential computer modeling issues. The  
24 first one here really should be called residential  
25 load to modeling issues, I think. And there have



1       been a number of suggestions over the last several  
2       years about areas where the residential ACMs could  
3       be improved.

4               And so we're going to be looking at slab  
5       edge modeling; natural ventilation modeling and  
6       whether it's too optimistic; there's a dust factor  
7       which is intended to adjust solar gains to account  
8       for typical shading and installation issues on  
9       production housing.

10              We have requirements for cool roofs, but  
11       no way to model cool roofs explicitly in the  
12       current ACMs. And we have a basement modeling  
13       provision which may have some issues involved if  
14       anyone ever builds a basement.

15              So there are a variety of issues, and,  
16       you know, there are others that could be included  
17       here if people have issues with the residential  
18       ACMs.

19              Next slide. Residential HVAC system  
20       modeling is really related to the TDV project  
21       strongly. As Bill said earlier, there's a major  
22       change that needs to be made to the residential  
23       ACMs to allow them to do hourly calculations, and  
24       support the TDV calculations; and also to improve  
25       the efficiency estimates for efficiency on a

1 seasonal basis.

2 And the proposal here is to use DOE2  
3 style HVAC systems models that people understand  
4 and are familiar with that, and will understand  
5 that that's a pretty simple straightforward  
6 approach.

7 We'd be focusing on air conditioners,  
8 heat pumps, probably not much of anything in terms  
9 of furnaces and gas heating appliances because  
10 they're not very sensitive to hourly and climate  
11 issues.

12 One thing that we are developing, or has  
13 been developed as part of the PG&E project, is an  
14 hourly distribution efficiency model that deals  
15 with ducts and attics and the variation in  
16 efficiency involved there.

17 We have to deal something about latent  
18 cooling loads. And then we also have to deal with  
19 sizing issues. And we'll talk about sizing when  
20 we get to the HVAC in the later part of the agenda  
21 here.

22 MR. PENNINGTON: I'd like to go directly  
23 to PG&E's presentation relating to residential  
24 envelope.

25 MR. MAHONE: We've got two things we'd

1       like to talk about. I'm going to pass it over to  
2       Nehemiah Stone to talk about the multifamily  
3       standards first.

4               MR. STONE: In the PG&E project -- this  
5       is Nehemiah Stone of the Hescong Mahone Group.  
6       In the PG&E project we're going to be looking at  
7       the option of having a separate set of standards  
8       for multifamily rather than having multifamily be  
9       split between the high rise residential and  
10      nonresidential, and low rise residential.

11             The prime issues are the same ones that  
12      have been highlighted, which is water heating and  
13      fenestration area. At this point we believe that  
14      the appropriate fenestration model will be the one  
15      that's in the nonresidential standards, the  
16      window/wall ratio, rather than a fenestration area  
17      per floor area.

18             And for water heating one of the main  
19      areas that energy is wasted is by using a central  
20      water heating system and using on the standards  
21      side a model that has distributed water heaters.  
22      And that energy then gets traded away for numerous  
23      elements back down to just the mandatory measure  
24      level.

25             So what we're looking at doing is

1       creating separate base cases depending upon what  
2       water heating system you're going to use. So that  
3       if you use a central system for a large  
4       multifamily project that is in the proposed side  
5       as well as the standards side.

6               MR. RAYMER: Bill, Bob Raymer, CBIA. I  
7       hope you're keeping in mind that although the  
8       condo market is only a 10 to 15 percent chunk of  
9       the total multifamily, the building code views  
10      multifamily to include both apartments and condos.  
11      And the design of the two are vastly different.

12             MR. STONE: We would be looking at a  
13      number of different models depending upon what the  
14      configuration of the building is. So that you  
15      don't try to have one size that fits all. And  
16      then waste energy in some cases, and require  
17      something that's just not cost effective in other  
18      cases.

19             MR. MAHONE: Okay, the next topic is the  
20      replacement in existing buildings. This is a  
21      little bit similar to what Bruce was already  
22      talking about.

23             There's a large existing potential  
24      energy savings within the existing building  
25      market, and we've got two approaches that we're

1 going to be exploring.

2 One is requirements for efficiency  
3 improvements when systems are replaced. The other  
4 one is possible requirements that could be placed  
5 on a home at the time that it is sold. Of the two  
6 this latter is the less -- probably less likely to  
7 fly. But we wanted to take a look at it anyway.

8 We're also going to be doing a similar  
9 exploration on the nonresidential side. So,  
10 that's it.

11 MR. PENNINGTON: Thanks. Is Dave Ware  
12 here today?

13 MR. WARE: Dave Ware representing Owens  
14 Corning, Manager of Codes and Regulation. I  
15 apologize for not having slides, but I trust that  
16 most people picked up the information out in  
17 front.

18 The first area that we would like to see  
19 a modification to would be the mandatory R19  
20 ceiling insulation level. I have advocated this  
21 for a number of years. The base case ceiling  
22 insulation level is a minimum R30 for all climate  
23 zones; some climate zones are R36.

24 And too often we're seeing that there is  
25 actually a tradeoff made to that mandatory level

1 with no actual benefit in comfort or anything else  
2 to the homeowner. So we'd like that to at least  
3 move up to the R30 level.

4 And there's some precedent for that.  
5 Other codes here in the west, and certainly ASHRAE  
6 code for most of the heating degree day climate  
7 areas illustrated in ASHRAE are above R19, as  
8 well.

9 We'd also like to consider modifying the  
10 base case envelope R values to provide a more  
11 stringent level equivalent to EnergyStar. The way  
12 the agenda is organized, some of this will be  
13 highlighted or discussed later, but anyway I  
14 wanted to make sure that I got that particular  
15 issue in.

16 California already is very close to an  
17 EnergyStar level depending upon climate zone. And  
18 significant statewide energy savings, as well as  
19 personal energy savings, can be garnered by  
20 providing better envelope and more tighter,  
21 certainly, construction, which is part of the  
22 EnergyStar procedure.

23 But the overall energy savings could be  
24 significant if there was an adjustment in the  
25 analytical procedure and through the base case

1 building assumption for all the envelope values.

2 For instance, as I just mentioned,  
3 making R30 as the minimum ceiling insulation  
4 value. In many climate zones you can move the  
5 wall insulation value to an R15 or to an R21,  
6 depending upon the climate situation. Those are  
7 very cost effective, and they would have  
8 significant energy savings potential.

9 Alterations we would also support.  
10 There's already been the two prior people who have  
11 talked have also proposed some changes to  
12 alterations. The alterations section in the  
13 standards basically puts you back to the mandatory  
14 level requirement.

15 There's approximately 5.3 million homes  
16 that the Department of Finance has already  
17 identified, single family homes that are out  
18 there, and 70 percent of those homes have been  
19 built prior to 1980.

20 And so, you know, we can all connect the  
21 dots and do the math. We know that there's a lot  
22 of alterations going on out in the field. And  
23 there's significant energy improvement and savings  
24 to the state, as well as to homeowners if we can  
25 tight up, and for instance, possibly make a

1       mandatory list, or a table of some sort that would  
2       be easy to enforce and easy for the renovation  
3       industry to understand what measures need to be  
4       improved during that construction process.

5               I think that's basically my issue on  
6       that topic.

7               MR. PENNINGTON: Thanks, Dave, very  
8       much. Is there someone here from Superior Radiant  
9       Insulation?

10              MR. ZOLA: Good morning, my name is Len  
11       Zola. I'm with Superior Radiant Insulation. And  
12       I'm here just to generally ask for an improvement  
13       in the ACM calculations for radiant barriers.

14              I represent a consortium of other  
15       companies besides my own of Advanced Foil Systems,  
16       Louisiana Pacific, International Paper, Willamette  
17       Industries, Langbord and Coastal Lumber.

18              Among other things, and I'll make it  
19       very short, the new things we bring to the table  
20       because radiant barriers have already been studied  
21       from the point of view of ceiling heat flux as  
22       well as the effect on duct efficiency.

23              We're going to be bringing additional  
24       information on their effect on the HVACs mounted  
25       in attics, specifically the effect on cooling



1 coils.

2 And in a much broader approach that  
3 also, you know, has to do with what PG&E said  
4 regarding the time and as it relates to peak time,  
5 et cetera, we've done extensive studies showing  
6 that the assumption in the vast majority of  
7 modeling is that the mass insulation R values  
8 remain constant at all times under all conditions.  
9 And we found that under a very high mean radiant  
10 temperature, i.e., an intense infrared field, as  
11 well as high delta T's regarding attic air  
12 temperatures and temperatures below, that there is  
13 a more than significant reduction in mass  
14 insulation R values. So we'll be dealing with  
15 that.

16 Thank you.

17 MR. PENNINGTON: Thank you. Is there  
18 someone here representing Cardinal Glass?

19 MR. DeVITO: My name is Eric DeVito.  
20 I'm with Cardinal Glass Industries. And I have a  
21 slide presentation, it was here at the back of the  
22 table. But copies of our comments were on the  
23 table. I also have copies of these slides if  
24 anyone's interested. They're just pretty brief,  
25 more or less a reiteration of what's in the

1        comments.

2                I'm not going to -- a lot right now are  
3        the first four items on the agenda, and I'm not  
4        going to spend a lot of time on this. You can  
5        actually go to the next slide.

6                Cardinal's been very active both in  
7        California and at the national level in the IACC,  
8        although I'm a relatively new face probably for  
9        most of you. Cardinal has been very involved in  
10       the development of the standards.

11               Out of our list and our comments I guess  
12       we've separated them into what we see as the top  
13       priority for the 2005 standards. And then the  
14       other ones we definitely see as beneficial, but  
15       we've identified these as what we think are some  
16       of the more important ones that we really would  
17       like to stand behind.

18               The first one is replacement  
19       fenestration which a number of the people have  
20       already raised today. And that would be mandatory  
21       SHGC and U factor requirements for replacement  
22       fenestration. The problem with the existing  
23       standards, I guess, is that they miss a huge  
24       market share of fenestration. There have been  
25       studies that say, you know, roughly 5 million

1 window units sold in California, 3 million of  
2 those are for replacement.

3 So there's a huge chunk of savings on  
4 the table right now. They could be immediate  
5 savings because these products are already  
6 available. They're already being used in new  
7 construction and they're readily available to be  
8 placed in existing homes right now. So this is a  
9 relatively quick, easy way to get a big bang for  
10 your buck right off the bat.

11 The next measure on the list we've  
12 noticed is SHGC as a mandatory measure. We had  
13 suggested this in previous comments we filed,  
14 particularly in the AB-970 process. And this,  
15 we're not opposed to tradeoffs, per se, but we  
16 think this particular provision, the .4 SHGC  
17 requirement provides savings, peak demand savings  
18 that are unmatched by other measures. So it  
19 should be a mandatory measure like other mandatory  
20 measures in the standards.

21 There are mandatory air leakage  
22 standards for fenestration. There are mandatory  
23 labeling certification requirements for  
24 fenestration. We believe that SHGC should be  
25 thrown into that category as well.

1                   The third item on the list is for  
2                   additions and alterations. Again, this is  
3                   something that's been brought up by other members  
4                   here today. We particularly support the IECC's  
5                   way that they do additions and alterations.

6                   And if you'll go to the next overhead,  
7                   please, I don't necessarily want to go through  
8                   each of the numbers on this table, but I just went  
9                   ahead and reproduced the IECC's chart.

10                  That's basically a five-line chart for  
11                  the entire United States that lists the U factor  
12                  SHGC, and also the R values of insulations. It's  
13                  a very simplified, easy way to do it because  
14                  existing homes are, I don't want to say tricky,  
15                  but it was often difficult to get compliance.  
16                  That's what the IECC took into consideration when  
17                  they went with this approach. They went with an  
18                  easy, straightforward, simplified, mandatory,  
19                  prescriptive path that would make it easy for a  
20                  lot of people to comply with the requirements.

21                  This is also the replacement window  
22                  table. All replacement windows installed under  
23                  the IECC have to meet the U factor and SHGC  
24                  requirements for those climate zones.

25                  So that's a type of approach we support

1 at the IECC, and we certainly would support in  
2 California.

3 The last item that I was given a chance  
4 to speak on today was the 25 percent glazing area  
5 suggestion we had. It's basically another  
6 prescriptive option to put in more glazing area  
7 for those who are interested in it. The IECC,  
8 again an approach we agree with, goes up to 25  
9 percent in their prescriptive options. So that's  
10 just something we throw out here and recommend it  
11 for California to look at with their standards.  
12 As well as possibly throwing in another  
13 prescriptive option for higher glazing area.

14 And I thank you.

15 MR. PENNINGTON: Thank you.

16 MR. STONE: Bill, can I ask a question?

17 MR. PENNINGTON: Sure.

18 MR. STONE: Given that good design means  
19 that you have very high SHGC on the south, did you  
20 mean mandatory measure for SHGC, or did you mean  
21 prescriptive, a different prescriptive level?

22 MR. DeVITO: Well, right now the  
23 prescriptive level on the prescriptive tables in  
24 the standards, you know, certainly leave those  
25 alone as they are. I'm speaking more of a

1       mandatory as in a mandatory measure like other  
2       mandatory measures that are in the standards right  
3       now. Meaning you can't trade it off. At all four  
4       orientations.

5                You know, we have proposed in the past  
6       there should be mandatory across the state. I  
7       know that turned some stomachs and there was a  
8       cost benefit analysis to at least make it the .4  
9       go for, I think it's 11 of the 16 climate zones.

10               So we would say at bare minimum make it  
11       mandatory in those 11 climate zones like it is in  
12       effect in the IECC. Now there is a potential  
13       tradeoff in the IECC under chapter 4, but nobody  
14       uses chapter 4. So in effect -- most people use  
15       chapter 5 of the IECC -- so in effect it is  
16       mandatory in the IECC as a basic requirement right  
17       now. And we would suggest the same approach in  
18       California.

19               MR. PENNINGTON: Thank you. I skipped  
20       over John Bowles. Is John Bowles here? No. Okay.

21               Gary Farber. Hi, Gary. You've got some  
22       time here to go over some of your ideas relating  
23       to residential envelope.

24               MR. FARBER: Gary Farber, Farber Energy  
25       Design. And U factor, that's been brought up. I

1       don't know that I need to say any more about that.  
2       Just looks like what I've seen economics would  
3       indicate that that needs to be studied. Lower U  
4       values for reference residential building.

5               Solar heat gain -- can everyone hear me?  
6       Solar heat gain coefficients, I'm a little  
7       concerned about the standards are initiating a  
8       very low solar heat gain coefficient that in  
9       certain instances that might weaken the standards  
10      for a building that comes in with a higher solar  
11      heat gain coefficient. Especially with the high  
12      rise residential standards.

13             In other words, if a proposed building  
14      comes in with a higher glass with a higher solar  
15      heat gain coefficient it's got more solar heat  
16      gain in the winter; that's beneficial, it's going  
17      to do better possibly than the referenced  
18      building. And I just think that that needs to be  
19      studied more. It hasn't been an issue in the  
20      past, but now that we are looking at low solar  
21      heat gain glass in our standards, I think it's  
22      something that needs to be addressed.

23             Orientation. Orientation of glazing is  
24      addressed to some degree on the performance  
25      standards because the reference building has a

1       glazing equally on all four sides.

2               However, in a prescriptive compliance  
3       the orientation is not addressed in any way. You  
4       can have all the glass on the west side of the  
5       building at this point. So I think that that  
6       needs to be addressed. Look at the idea of having  
7       some type of limit on the west orientation, since  
8       that addresses our peak load issue.

9               Let's see. Another thing on solar heat  
10      gain is I think we ought to consider whether any  
11      fixed shading should be mandatorily calculated.  
12      Right now it's optional whether you calculate it  
13      or not. And houses with south orientation may be  
14      getting credit for winter solar heat gain when, in  
15      fact, they've got deep overhangs and not getting  
16      much benefit from the glazing. It may be that the  
17      standards ought to say if there's a fixed shading  
18      it shall be modeled.

19              Glazing areas. Right now you know, the  
20      low rise residential glazing areas are based on  
21      floor area, and a lot of concern about whether  
22      those areas are appropriate, and whether  
23      appropriate for different types of residential  
24      buildings, such as multifamily.

25              I come up with a different formula that



1 is partly based on floor area and partly based on  
2 the perimeter of the building, indirectly related  
3 to wall area. And in combining those you can get  
4 a result where the allowed glass area is reduced  
5 as the size of the building increases. And get,  
6 in other words, one common formula possibly could  
7 suffice for all building types. Just an idea, but  
8 something to consider.

9 With a formula like that then we don't  
10 have to get into these games of what kind of  
11 building is it, and what's the breakpoint and that  
12 kind of thing.

13 Someone brought up multiunit standards  
14 and low rise versus high rise. It seems to me  
15 that possibly a more rational breakpoint is  
16 whether the units have their own space heating  
17 systems or whether they have central heating  
18 systems. That that is a much more rational  
19 breakpoint than the number of floors if there's  
20 going to be two different standards.

21 Skylights and greenhouse windows. The  
22 current standard, this is a surprise I just  
23 learned in the 2001 process, I hadn't realized  
24 this, that in the performance compliance approach  
25 you are allowed to assume the prescriptive default

1 U factors for skylights and greenhouse windows.  
2 And I believe most energy consultants use the NFRC  
3 ratings or the default table ratings, not the, I  
4 forget what we call this other factors that are --  
5 right now in prescriptive, virtually any double-  
6 pane skylight or greenhouse window is allowed to  
7 meet the standard.

8 And we could take those same factors and  
9 use performance and I think the -- and performance  
10 compliance, to be consistent with the way  
11 performance compliance works, we ought to just use  
12 the actual default tables or NFRC table and not  
13 give that credit where it's not really due.

14 Concrete floors. Couple issues there.  
15 One is radiant floors. I think we need to look a  
16 little bit more about slab-on-grade radiant floors  
17 and what type insulation values are practical.  
18 I've heard from several builders and architects  
19 about the problem of winter water in the soil  
20 taking the heat away from the slab.

21 Obviously it depends on site-specific  
22 conditions and, you know, what the water table is  
23 and drainage patterns are. But it can be a big  
24 issue, so I think maybe that needs to be  
25 addressed.

1                   The other one is raised concrete floors.  
2           In previous standards, I think up until the '98  
3           standards, there was mandatory raised concrete  
4           floor insulation requirement. And that went away  
5           I believe in '98. And I would like to see that  
6           reinstated because I think the standards need to  
7           be concerned not only with energy savings in  
8           general, but also with energy equity. And people  
9           living on cold concrete floors, I think they're  
10          not getting a fair deal in this.

11                   That's it.

12                   MR. PENNINGTON: Okay, thank you. Okay,  
13          Steve Gates.

14                   MR. GATES: I just very quickly wanted  
15          to comment on your concept of construction quality  
16          and agree with you that it's very important. It's  
17          one thing to require that something be installed,  
18          but if it's not consistently installed then that's  
19          clearly an area that needs to be addressed.

20                   My personal observations of blown in  
21          insulation in attics is that insulation very  
22          commonly tends to be to the required thickness  
23          near the attic access where an inspector may pop  
24          up his head. But it's very commonly much thinner  
25          than that in the more remote areas.

1                   In fact, one house of mine had -- the  
2                   family room was the most remote area, and half of  
3                   it was totally bare.

4                   Perhaps a solution as simple as having  
5                   some kind of plastic, color coded, clip on depth  
6                   gauge that you mount on the ceiling trusses and  
7                   then you blow the insulation up to, you know, the  
8                   correct color might be a way that could help to  
9                   mitigate some of this.

10                  Clearly, inspectors don't want to be  
11                  clumping through, you know, 12 inches or more of  
12                  blown in insulation to take a peek at things. But  
13                  if they could view depth gauges from a distance  
14                  with a pair of binoculars it could be pretty  
15                  clear, you know, whether or not insulation has  
16                  been blown into the thickness required.

17                  Also clearly with blown in insulation,  
18                  since it tends to settle over time, the standards  
19                  might want to address a higher thickness to start  
20                  with to take into account a settling factor. I'm  
21                  not aware of what that settling factor is, but I  
22                  am aware that it does happen over time.

23                  MR. PENNINGTON: Thanks a lot. Okay,  
24                  are there other people that have suggestions  
25                  related to residential building envelopes?

1 MR. PAK: This is related to --

2 MR. PENNINGTON: You have to identify  
3 yourself, please.

4 MR. PAK: Actually it's not related to  
5 envelopes specifically, but does address the issue  
6 of alterations. It's Al Pak. I represent Web  
7 Service Company. And we have provided some  
8 comments to Mr. Alcorn.

9 But there's nothing in the list related  
10 to laundry facilities. So I wanted to bring that  
11 up here. It does affect the issue raised by PG&E,  
12 the Commission on alterations.

13 MR. PENNINGTON: I'm sorry, we did  
14 receive your comments too late to actually make  
15 the agenda. But it seems like that would be  
16 appropriate to talk about during the water heating  
17 segment if you agree.

18 MR. PAK: This has more to do with  
19 clothes drying than the washing end. I can wait  
20 till the water heating if you'd prefer.

21 MR. PENNINGTON: Okay. Yeah, I -- maybe  
22 even the other category would be the most  
23 appropriate place for us to talk about it. Why  
24 don't we do that instead.

25 MR. PAK: I'm sorry?

1                   MR. PENNINGTON: We'll have you come  
2 back up at the other category, since it --

3                   MR. PAK: Okay.

4                   MR. PENNINGTON: -- if you don't think  
5 it fits in water heating.

6                   MR. PAK: Very good, thank you.

7                   MR. PENNINGTON: All right. John.

8                   MR. HOGAN: John Hogan, City of Seattle.  
9 Hearing the discussion about considering an  
10 alternate category for multifamily construction I  
11 would encourage you for one of the options to  
12 consider the Washington State model where all  
13 group R occupancy is treated the same. So all  
14 residential buildings, high rise and low rise,  
15 hotel and motel guestrooms all have the same  
16 prescriptive envelope requirements.

17                   You can end up with different  
18 performance targets, you know, energy budgets that  
19 people use. But it seems where the rubber hits  
20 the road is what the materials are that are  
21 installed in the buildings. And it's a lot easier  
22 for contractors and inspectors if everybody's got  
23 the same R values and the same type of windows and  
24 everything.

25                   MR. AKERS: Good morning, I'm Ron Akers

1 with Advanced Foil Systems. Just here today and  
2 like to say thank you up front for the work that  
3 was done on AB-970 with the involvement of radiant  
4 barriers.

5 I think I'd like to see us working  
6 together and backed by Len Zola with Superior  
7 Radiant and Louisiana Pacific, but now that  
8 there's time to work on the current standards  
9 involving radiant barriers maybe we need to finite  
10 some of the details, some of the credits, maybe  
11 possibly dealing with just the attic envelope that  
12 we are dealing with and take out some of the other  
13 factors.

14 But those of you, I welcome any comments  
15 and suggestions on anything that we can do  
16 together. Just please feel free to contact me.

17 MR. PENNINGTON: Thank you.

18 MR. COTTRELL: Charles Cottrell  
19 representing the North American Insulation  
20 Manufacturers Association.

21 Thank you for giving me this opportunity  
22 to speak to you this morning. NAIMA looks forward  
23 to working and participating in this process to  
24 increase the energy efficiency of homes in  
25 California.

1                   As many of you know the best time to  
2                   increase the energy efficiency of the envelope is  
3                   at the time of construction, and this is the time  
4                   that should be maximized.

5                   I understand your concern with peak  
6                   loads and shifting, but obviously reducing the  
7                   entire load across the entire time that the  
8                   building is operating is also important.

9                   Many homes today will be around for 100  
10                  years or more, and now is the time to make those  
11                  components such as the envelope and ducts as  
12                  efficient as possible.

13                 Mass insulation is very inexpensive and  
14                 easy to install. We'd also like to work with the  
15                 Commission to improve the efficiency and the  
16                 quality of installation of mass insulation.

17                 Thank you.

18                 MR. PENNINGTON: Thank you. Are there  
19                 other suggestions or questions of any of the  
20                 proposals that were made before? Mike.

21                 MR. GABEL: Mike Gabel, Gabel  
22                 Associates. I just wanted to ask the staff if  
23                 they're going to do some in-depth analysis of the  
24                 demographics of what would happen if you increase  
25                 the prescriptive glazing area above the current



1 levels, since the majority of single family homes  
2 typically are at or go over the 16 and 20 percent  
3 respective percentages. And I'm concerned about  
4 losing energy overall if we let those increase to  
5 match the proposed building.

6 MR. PENNINGTON: I think it is important  
7 to try to evaluate the consequences. Bruce, do  
8 you want to react to that?

9 MR. WILCOX: If you have some clue as to  
10 how to do that, Mike, it would be -- if you could  
11 sort of model the building industry design  
12 thinking process or something to decide if the --

13 MR. GABEL: Well, I think -- I mean  
14 there clearly are demographics. You go to big  
15 builders who do tract homes or do a lot of  
16 construction, there's information on how many  
17 people go over the prescriptive limits typically  
18 and --

19 MR. WILCOX: Well, the latest research  
20 shows that, you know, the average is actually down  
21 around the prescriptive limits or less.

22 MR. GABEL: Yeah, I'm wondering, though,  
23 if multifamily homes are averaged in. And I guess  
24 all I'm saying is that I think the staff has to do  
25 some serious research on allocating the, you know,

1       some resources in that direction.

2                   MR. ELEY:  Yeah, one of the things we're  
3       going to be looking at, Mike, is a database of  
4       about 800 homes that was collected through utility  
5       research.  And these show, you know, quite a  
6       variation in window area.  And a significant  
7       difference between single and multifamily.

8                   I believe the average from this database  
9       for single family was 18, 19 percent, something  
10      like that.  And the average for multifamily was 12  
11      percent or something like that.

12                  But within there there was a huge range.  
13      There were some homes with 35 percent; some with  
14      13 percent.  And even with multifamily.

15                  So we will definitely be looking at  
16      that.  But we're not here really to debate the  
17      merits of these things, just try and get  
18      everything out on the table.  Thank you.

19                  MR. GABEL:  Okay, thanks.

20                  MR. PENNINGTON:  John.

21                  MR. HOGAN:  In terms of additional data  
22      source for that question, I realize it's not  
23      California, but in the Northwest Washington has  
24      had limits on glazing area for a long while.  And  
25      the State of Oregon has had unlimited glazing

1 past. So it's people building the same types of  
2 buildings in similar climates. And so maybe  
3 there's some information there that you can start  
4 to draw from a little bit.

5 But I would also share the concern you  
6 raised, Charles. Once you get to high rise  
7 multifamily and condominiums, -- well, actually  
8 you were talking about low rise multifamily, I  
9 think, --

10 MR. ELEY: Low rise.

11 MR. HOGAN: High rise, I think, starts  
12 to go the other way where people are --

13 MR. ELEY: Exactly.

14 MR. HOGAN: -- much less concerned about  
15 the cost, and so there's lots of glass.

16 MR. ELEY: This database was only low  
17 rise.

18 MR. PENNINGTON: Okay, anyone else  
19 before we move to water heating? I'm sorry, HVAC.  
20 No. Okay. Bruce, do you want to start water  
21 heating?

22 MR. ELEY: No, HVAC.

23 MR. WILCOX: HVAC, okay. Yeah, so I  
24 have a slide. Okay, now for a really  
25 noncontroversial proposal.

1 (Laughter.)

2 MR. WILCOX: The idea here is to look at  
3 a requirement that would limit the size of air  
4 conditioners in low rise residential buildings.  
5 And the reason for this is there is some evidence  
6 that shows that over-sized air conditioners are a  
7 disproportionate problem on peak. And so there's  
8 a benefit to limiting the size of the air  
9 conditioners.

10 The intention here is not to require new  
11 efficiency measures, you know, not to require  
12 better shading or anything like that. It's simply  
13 to reduce the tendency for people to put in air  
14 conditioners that are actually sized larger than  
15 the loads for the house.

16 So the proposal is to take sort of the  
17 industry standard calculation approach, which is  
18 one good source for that is the ASHRAE handbook of  
19 fundamentals; to do some work on that to get it to  
20 fit with California measures and the way we do ACM  
21 calculations in California.

22 The industry standard measure approach  
23 does not deal with solar heat gain coefficients  
24 and radiant barriers and duct leakage and some of  
25 the things that we've moved forward with in the

1 last few years.

2 We'd have to deal somehow with design  
3 data and is that local design data or climate zone  
4 design data. The issue of multiple orientations  
5 and how that gets implemented for production  
6 houses and custom one-of houses is an interesting  
7 issue.

8 There's the issue of zonal systems and  
9 what happens when you have zonal systems in  
10 attached housing, and how that's treated  
11 differently in industry standard sizing  
12 approaches.

13 Multifamily buildings. The proposal is  
14 probably to go ahead and use the same approach  
15 that's being used for performance compliance now  
16 where you treat the whole building as a single  
17 unit and calculate the total cooling load. And  
18 you get to treat it all as one large entity.

19 There's the issue of what you would do  
20 for prescriptive sizing. Do we come up with a  
21 square feet per ton limit that you can comply with  
22 without any calculations at all. That's the  
23 straightforward proposal.

24 And then finally the idea of having  
25 tradeoffs. If you simply want to put in a larger

1       air conditioner than standard calculation shows,  
2       should you be able to do that by using something  
3       with a better EER, or lower fan energy use on  
4       peak, or putting in a photovoltaic panel to make  
5       up for the difference or whatever. Lots of  
6       options there.

7               So that's the general direction. And  
8       there's lots of issues and details and so forth.  
9       But I think this is the approach that's going to  
10      be pursued by the CEC.

11             Next slide. During AB-970 we moved the  
12      standards into dealing with the installed  
13      efficiency of air conditioners, dealing with  
14      charge and air flow, and verification and  
15      thermostatic expansion valves and so forth.

16             And the idea here is to build on that.  
17      Take a look at the calculations and the tests and  
18      the verification approaches that were done in that  
19      proceeding. And see if there are reasons to  
20      expand those or revise the procedures, or deal  
21      with loopholes and so forth.

22             The question of whether we should expand  
23      the charge and air flow procedure to deal with  
24      systems that have thermostatic expansion valves;  
25      right now it's an either/or. You either have a

1       thermostatic expansion valve or you do the charge  
2       and air flow. But the charge and air flow testing  
3       is equally applicable to thermostatic expansion  
4       valves.

5               And then the area of potential new area  
6       of savings is looking at air handler fans. And  
7       the evidence which indicates that most air handler  
8       fans in residential buildings actually consume  
9       more energy than you assume in the test procedures  
10      and the rating procedures. And look at how that  
11      might be reduced, either through some sort of a  
12      verification at installation or some procedure to  
13      do a high efficiency fan and motor combination, or  
14      some combination of those.

15             Next slide. Residential duct systems.  
16      We've done a lot of work on duct systems in the  
17      last couple versions of the standards. But there  
18      are some areas that potentially could be improved  
19      and modified.

20             The CEC is particularly interested in  
21      looking at options for encouraging people to  
22      locate ducts inside the conditioned space and  
23      reduce the area of duct surface area that's  
24      exposed to hot attics and so forth.

25             This may be mostly a question of

1 information and manuals and that sort of approach  
2 rather than regulations.

3 There's also a question of specific  
4 standards for some of the details on ducts that  
5 still apparently there is unlined flex duct being  
6 installed in California, which may or -- may be  
7 particularly unsuitable to long-term performance.

8 We have a duct design procedure that  
9 gives a credit in the standard, and there are some  
10 issues about how well done that is and how well it  
11 really works. And we'll be looking at that.

12 There's some new options for duct  
13 leakage testing that have been put forward. LBL  
14 has their delta Q method; and there's several  
15 different things that have been -- being looked at  
16 in the technical literature. We'll be looking at  
17 those.

18 The issue of should we require more than  
19 R4 duct insulation. That's certainly possible and  
20 can be looked at from an economics point of view.

21 And then finally there has been some  
22 changes made in the ASHRAE standard 152  
23 methodology for calculating distribution  
24 efficiency. The ACM method is based on the older  
25 version and maybe there's some revisions that



1       could be made to make that a better calculation.

2               I think that's it.

3               MR. RAYMER: Question. Bob Raymer,  
4       CBIA. The Legislature passed SB-732 dealing with  
5       toxic mold and directing Department of Health  
6       Services and other agencies to look into coming up  
7       with a standard.

8               And looking down the line there's a very  
9       good chance that within the next two, possibly  
10      three years, either the Legislature or a series of  
11      state agencies will be calling for some type of at  
12      least limited mechanical ventilation, such as a  
13      bathroom fan that's either going on 24 hours a  
14      day, or goes on when the light gets turned on.

15              And so you may want to -- I'm not  
16      talking about the large whole house fan, but some  
17      type of limited ventilation that you may want to  
18      keep an eye on that proceeding.

19              MR. PENNINGTON: Thank you. Okay, PG&E.

20              MR. MAHONE: Okay, thank you. Doug  
21      Mahone for PG&E.

22              Gary Fernstrom, who spoke a few minutes  
23      ago, asked me to mention a point that he didn't  
24      make, which is that this effort that PG&E is  
25      putting forth, and the extra support from the

1       other California utilities is actually funded  
2       through the public benefits moneys, which the CPUC  
3       oversees. And it's essentially been an extension  
4       of the energy efficiency programs that the  
5       utilities have been running.

6                Okay, on the residential HVAC, Marshall  
7       Hunt from PG&E will describe the proposals that  
8       we're pursuing.

9                MR. HUNT: Thank you, Doug. What we're  
10      looking at is a couple more advanced technologies,  
11      but they all do address peak efficiency. And some  
12      of them are just coming out of the labs and are  
13      emerging.

14               But as we work and develop room for them  
15      in the marketplace, manufacturers are stepping up  
16      to the plate. And we hope to create room for them  
17      at the table.

18               One of the most interesting ones we  
19      start off with is the evaporative cool condensers.  
20      And we have done field tests with these. And  
21      essentially you immerse the condenser in  
22      evaporatively cooled water. And the nice thing  
23      about this is when we tested it at our lab in San  
24      Ramon it's just not at all impacted by high  
25      temperatures.

1                   And as everyone knows, during our awful  
2                   heat storms the air source units degrade  
3                   tremendously in performance. Whereas these don't  
4                   degrade at all, and therefore as bullet 4 points  
5                   out, we get a 20 to 30 percent increase in  
6                   efficiency relative to an air cooled unit at peak.

7                   So we are looking at developing the  
8                   methodology which would give these credit. I mean  
9                   credit just to give more alternatives to customers  
10                  on this.

11                  Next slide, please. Residential night  
12                  vent cooling. The response in our 1, 2, 3 cash  
13                  back program to whole house fans has been  
14                  tremendous and almost everyone in California  
15                  actually uses night vent cooling.

16                  And what we want to do is to look in  
17                  further depth at night vent cooling. We actually  
18                  have going on right now in the state, and Davis  
19                  Energy Group is doing it, advanced night vent  
20                  cooling procedures. Actually a piece of  
21                  mechanical equipment that does a better job. You  
22                  might call it a smart night vent cooling system.  
23                  I don't know what they call it as a commercial  
24                  product.

25                  But we can do a better job with night

1       vent cooling than we have in the past. And in the  
2       past, this relates earlier to what Bruce Wilcox  
3       talked about, we had a very very optimistic  
4       natural vent cooling algorithm. And what may  
5       happen is, as we tighten down what the natural  
6       vent cooling was doing, we might discover that we  
7       need this smart night vent cooling, albeit a  
8       mechanical vent cooling.

9               We need to have a better algorithm, a  
10       better analysis routine that would allow us to  
11       look at a mechanical system that gives us the vent  
12       cooling.

13              And also a good thing about the night  
14       vent cooling is we can filter the air, which some  
15       people find beneficial.

16              Next slide, please. Advanced  
17       evaporative cooling. We had as part of our 1, 2,  
18       3 cash back this last year, we had pretty good  
19       response to advanced evaporative cooling. Many  
20       many people are understanding that it's not the  
21       old swamp cooler we're looking at, but we're  
22       looking at media such as a Munters media, or  
23       there's another brand, Glacier.

24              But there are people moving back into  
25       the marketplace bringing in high quality evap

1       cooling, both direct and indirect. We'd like to  
2       see more of that.

3               At the present time there is a very  
4       simple evaporative cooling credit in Title 24, and  
5       we want to take a better look at that so that our  
6       customers can have again options of credit.

7               But we definitely don't want to have  
8       this used as a tradeoff to weaken the building,  
9       because evaporative cooling works best in a very  
10      high quality, low load, peak load building.

11              That's all for this section, thank you.

12              MR. PENNINGTON: Okay, thank you. Dave,  
13      are you still here?

14              MR. WARE: Dave Ware, Owens Corning,  
15      Manager of Codes and Regulation.

16              First of all I support some of the  
17      comments that were made by Bruce Wilcox on duct  
18      systems in general, and duct insulation. And  
19      that's really what I'm advocating here. And,  
20      again, have advocated this in past years, as well.

21              I think it's high time that the duct  
22      insulation table be modified and become more  
23      aligned with codes that are around the country.  
24      Oregon's code is a base R8. Washington code is a  
25      base R7. The International Energy Conservation

1 Code is a base R8. J.P. Lamborne, for instance,  
2 one of the largest fabricators of flexible duct in  
3 the western U.S., the only market he has for less  
4 than R8 is here in California. And that is a  
5 shame.

6 The current duct insulation requirements  
7 are built around or basically stolen from the 1997  
8 Uniform Mechanical Code. And in no time in our  
9 life will that ever be modified under the building  
10 code change process, given the auspices of the  
11 International Conservation Code.

12 So I think there's a lot of writing on  
13 the wall that it's high time, if indeed the Energy  
14 Commission, this group feels that there is merit  
15 and savings due to increased base duct insulation  
16 values, that we bring that back into the energy  
17 efficiency standards so that we can modify that;  
18 so that we can do cost effectiveness on that; so  
19 that we can adjust and modify those R values to  
20 affect the buildings that we have, and that these  
21 regulations effect.

22 Thank you.

23 MR. PENNINGTON: Okay, thanks. Gary.

24 MR. FARBER: Gary Farber, Farber Energy  
25 Design. I agree on AC sizing, that needs to be

1       addressed. I think the residential standards used  
2       to have limits on both the furnace and AC and they  
3       went away. I believe that was mainly because of  
4       the arguments that furnaces needed to -- the  
5       sizing was a little hard to regulate due to the AC  
6       air flow requirements. But I don't see why we  
7       can't get back to at least regulating the AC  
8       sizing.

9               I'd like to see the residential ACM deal  
10       with evaporative cooling. I'm not actually quite  
11       sure whether it does or doesn't because I never  
12       see any projects where they're proposing central  
13       evaporative cooling, but if it does it probably  
14       needs to be looked at to see whether the numbers  
15       are correct. And if it doesn't, it needs to be  
16       incorporated. Because I'd like to see evaporative  
17       cooling encouraged.

18              Same thing with air to air heat  
19       exchangers. I think with the need for more  
20       ventilation of houses, it certainly is going to  
21       become more cost effective to do air to air heat  
22       exchange to recover the heat and outgoing exhaust  
23       air.

24              Let's see, heat pump sizing, I believe  
25       the standards call for the heat pump to be sized a

1 minimum of a 75 percent of the load. Actually I  
2 can't even recall whether that says nonres or  
3 that's across all building types. Do you recall?  
4 That's just nonres, I see. Okay. So maybe that's  
5 not an issue here.

6 High rise res, maybe, that falls under  
7 that standard, so, anyway, something to be looked  
8 at whatever building type you're talking about. I  
9 know at least in nonres 75 percent, you know, I  
10 don't know why we have that when we're going to be  
11 relying on the electric resistance at peak  
12 conditions.

13 Economizers. Obviously in nonres we  
14 mandate economizers on larger size AC systems. In  
15 residential we don't. The residential standards  
16 kind of dismiss the idea of having large scale  
17 systems.

18 So obviously on larger residential  
19 projects, even low rise sometimes the central area  
20 is like the community rooms and offices and that  
21 kind of thing will have larger AC systems. And  
22 sometimes they are 7.5 tons or greater. So I  
23 think the residential standards ought to consider  
24 having a mandate for economizers just like the  
25 nonres standards do.



1                   And I think that covers my topics.

2                   MR. PENNINGTON: As I recall, Gary, you  
3                   had a point related to central -- did you already  
4                   make this point? You already argued, I guess,  
5                   this was related to water heating, the central  
6                   versus individual system.

7                   MR. FARBER: Right, well, space heating.  
8                   I brought that up in the earlier one where if  
9                   there's going to be different standards for high  
10                  rise maybe the break point ought to be the type of  
11                  heating system, central versus individual system,  
12                  as opposed to number of floors.

13                  MR. PENNINGTON: Okay. All right, thank  
14                  you. Steve Gates.

15                  MR. GATES: Could I have the first  
16                  slide, please. The gentleman from Owens Corning  
17                  put this better than I could, but in terms of flex  
18                  duct insulation, but let me comment that in terms  
19                  of cost effectiveness it's hard for me to imagine  
20                  that R8 flex duct might be less cost effective  
21                  than the very expensive construction measures  
22                  being considered to enclose ducting within  
23                  conditioned space. So certainly it makes sense to  
24                  deal with the obvious.

25                  I would like to emphasize one other

1        thing having to do with ducting in attics as well  
2        as possibly even insulation in attics. And that  
3        is to point out that there is flex ducting  
4        available with an aluminized jacket, which is much  
5        more reflective to radiant energy than the  
6        polyethylene jackets that are cheaper and are  
7        commonly found in ducting.

8                So given the intense radiant flux that's  
9        normally found in an attic, it certainly makes  
10       sense to try to protect the ducting from radiant  
11       gains as much as possible.

12               Related to that, just a second thought  
13       about insulation in general, and that is that  
14       maybe others in the room can answer this. But the  
15       question has to do with does radiant energy in an  
16       attic stop at the surface of insulation. Or does  
17       it penetrate and actually get absorbed within the  
18       first few inches of the insulation.

19               If that's the case, then the R values  
20       that are currently thought exist in attics don't  
21       exist. If you capture the radiant energy within  
22       the insulation, itself, the performance of that  
23       insulation is totally different than if you assume  
24       that the radiation stops at the surface.

25               And in fact most insulation is, from

1        what I understand, is rated with an assumed 10  
2        degree differential between the insulation and the  
3        environment. Clearly the radiant flux in an attic  
4        is totally different than what some of these -- if  
5        that's the case, you know, the radiant environment  
6        in an attic is a totally different environment  
7        than what insulation is rated at.

8                Next slide, please. This next topic has  
9        to do with energy efficiency ratios versus  
10       seasonal energy efficiency ratios of packaged  
11       equipment. As is, the standards address both of  
12       these.

13               The interesting thing is that --  
14       actually, let's go to the next slide -- the  
15       correlation between EER and SEER is quite varied.  
16       One might expect that a unit with a high EER would  
17       also have a high SEER. That is not always the  
18       case. That tends to be the case.

19               We have preliminary data in a project  
20       we're working on now that indicates that the SEER  
21       of a unit can actually vary quite a bit by climate  
22       and the actual usage pattern of that unit. We're  
23       involved with a project at Southern California  
24       Edison now to investigate this in further detail.

25               But depending on the results of that

1 study it might actually make sense to make the  
2 requirements for units more climate specific. For  
3 example, a unit in Palm Springs may perform quite  
4 differently than the same unit on the coast. And  
5 it might make sense for California to recognize  
6 the extremes that we have in our climates and vary  
7 the required equipment efficiencies accordingly.

8 Let's go down a couple more slides.  
9 There will be one entitled modeling issues, I  
10 believe. Should be the last slide.

11 Okay, there's some discrepancies in the  
12 standards now in terms of what comprises  
13 residential versus nonresidential. For example,  
14 hotels and motels four stories and higher are  
15 considered nonresidential. Hotels, single story  
16 hotels are -- excuse me -- all hotels and motels  
17 are considered nonresidential, even if they're  
18 single story.

19 Whereas multifamily housing that's four  
20 stories or higher is nonresidential; less than  
21 that is residential.

22 There are differences in the computer  
23 programs used to model one versus the other. That  
24 criterion is somewhat gray in terms of what is  
25 residential and uses, you know, one computer

1       program versus nonresidential and uses another.

2               There was mention earlier today about  
3       using DOE2-like algorithms in the residential  
4       programs to better model mechanical systems.  
5       Another thought that we are proposing is that you  
6       consider using DOE2 to model nonresidential  
7       buildings. That's probably an easier task in  
8       terms of necessary changes than going the other  
9       direction.

10              Okay, end of my comments.

11              MR. PENNINGTON: Okay, thank you.

12              MR. AHMED: I have a question

13       for --

14              MR. PENNINGTON: Okay.

15              MR. AHMED: This is Ahmed, consultant to  
16       Southern California Gas. You mentioned that to  
17       have different efficiencies for different climate  
18       zones for air conditioners would make sense.

19              Do you imply SEER as the definite  
20       descriptor, or EER?

21              MR. GATES: Neither one is necessarily  
22       the correct description. And that's the thrust of  
23       the project that Hirsch and Associates is working  
24       on with Southern California Edison, is to  
25       basically investigate as to whether there are

1 better selection criteria that might be available.

2 For example, manufacturers right now  
3 have data for, you know, a wide range of operating  
4 conditions. If that data was provided in an  
5 electronic format it could be directly used in the  
6 compliance programs to assess what an efficiency  
7 is.

8 And it could well be that a unit that  
9 has a very SEER in accordance with the specified  
10 rating conditions now may not necessarily perform  
11 as well in a given climate zone for a given  
12 building as a unit with different performance  
13 characteristics.

14 MR. PENNINGTON: Doug.

15 MR. MAHONE: Doug Mahone from the  
16 Heschong Mahone Group. One thing that I guess I'd  
17 like to emphasize as part of the work that we're  
18 doing on the TDV proposal, an important goal of  
19 that is to be able to distinguish the performance,  
20 distinguish between the performance of air  
21 conditioning units that perform well on peak  
22 versus units that don't perform so well on peak.

23 And part of our work has been looking  
24 into some of the modeling issues that are involved  
25 in being able to make that distinction.

1                   And one of the fairly obvious  
2           conclusions from that work is that the SEER rating  
3           for residential scale equipment is a very poor  
4           predictor of on peak performance. And the  
5           detailed modeling approaches that we're developing  
6           for hourly modeling of equipment are looking into  
7           ways to enhance the modeling of systems so we can  
8           distinguish more effectively between units that  
9           perform well on peak.

10                   MR. PENNINGTON: Yes, Noah.

11                   MR. HOROWITZ: Noah Horowitz, NRDC.  
12           This is more a bookkeeping reminder that we need  
13           to update our base case as the federal regs kick  
14           in from DOE for air conditioners and water  
15           heaters, depending on what happens on Title 20 to  
16           make sure we update Title 24.

17                   MR. PENNINGTON: Do you recall exactly  
18           what the timing of that is?

19                   MR. HOROWITZ: I don't, but maybe  
20           Valerie can --

21                   MR. PENNINGTON: Never mind. I didn't  
22           ask that question.

23                   (Laughter.)

24                   MR. STONE: I have them in a document if  
25           you want me to go through them, but it's actually

1 fairly complex by equipment size and type. So, it  
2 would take --

3 MR. PENNINGTON: No thanks.

4 MR. STONE: It would take about ten  
5 minutes to get through that.

6 MR. PENNINGTON: Hasheem.

7 MR. AKBARI: Thank you. Hasheem Akbari  
8 from Lawrence Berkeley Lab. I would like to  
9 recommend the Commission to start looking at  
10 requiring reflective coating for the exposed duct  
11 systems. We do have some measure data indicating  
12 that there is great significant energy efficiency  
13 opportunities possible by having exposed duct  
14 systems in the residential buildings to be  
15 required to have reflective coatings.

16 MR. PENNINGTON: Thank you. Other  
17 suggestions, ideas? Yes, sir.

18 MR. DeVITO: Eric DeVito of Cardinal  
19 Glass Industries. I'd just like to pick up on a  
20 point that Bruce made with air conditioner sizing.  
21 I'm certainly not an HVAC expert, and don't claim  
22 to be, but one thing with regard to our product,  
23 and specifically our low solar gain glass, is that  
24 air conditioning sizing is a big issue and goes  
25 hand-in-hand well.



1                   And you can insure that you get the most  
2                   peak demands for the lowest cost if you would tie  
3                   the two together. And you can significantly  
4                   reduce and downsize air conditioner equipment if  
5                   you do require certain things like low solar gain,  
6                   low E glass.

7                   So I guess I would just like to throw in  
8                   that two cents, and throw in my support for  
9                   putting air conditioning sizing requirements into  
10                  the standards somehow.

11                  MR. PENNINGTON: Thank you. Yes, sir.

12                  MR. WELGUISZ: Rick Welguisz, Manager of  
13                  Application Engineering for Trane Unitary Products  
14                  Group out of Tyler, Texas.

15                  I'd like to comment on some of the  
16                  comments on sizing here. We do support -- manual  
17                  J for proper size and in their design conditions.  
18                  It does perform relatively well. I'll have to  
19                  discourage any proposal for prescriptive, as we  
20                  have found that sizing in a structure or house,  
21                  residential house, can vary between 400 to 1500  
22                  square feet per nominal ton.

23                  But also encourage that you look very  
24                  strongly at the latent, because latent, that  
25                  requirement doesn't go down during the day or the

1       night. And under mild load conditions improper  
2       sizing and too much latent increases what we call  
3       discomfort. That is you lose your comfort with  
4       the air conditioning.

5               Also proper sizing does also reduce the  
6       energy use, and improves the comfort issue. And  
7       that's what we're really, and even though we  
8       manufacture equipment, we have to recommend the  
9       comfort equation. Proper sizing is one way to get  
10      there.

11             MR. PENNINGTON: Thank you. Yes, sir.

12             MR. FISHER: Carl Fisher, L.K. Fisher  
13      and Associates. And so as not to take up time  
14      further in the proceedings, I'd like to have my  
15      comments carry over to water heating in the nonres  
16      section, too.

17             I'm concerned with the fact that the  
18      standards do not address a ground coupled heat  
19      exchange system. They only address air coupled or  
20      air source exchangers and fossil fuel combustion.

21             This whole technology which is comprised  
22      by quite a number of manufacturers now produces a  
23      heat pump which is coupled to the earth, and  
24      there's a number of kinds. Some are done with a  
25      water transmission through pipes, and another is a

1 direct exchange or expansion.

2 The air conditioning side of these is  
3 capable today of lowering the summer peaks by  
4 about 30 percent, give or take, depending on the  
5 use. Far greater than any air source conditioner  
6 can do at this time.

7 The other side of the equation is the  
8 heating side where no fossil fuels are burned. We  
9 have COPs that are up above 3.5 and some above 4.  
10 There's no heating technology today that can come  
11 anywhere close to that.

12 And this also applies for domestic hot  
13 water heating and hot water process, process hot  
14 water for commercial applications, et cetera, et  
15 cetera.

16 I'd like to make sure that the earth  
17 coupled or earth source technologies are looked at  
18 seriously in this go-round. Thank you.

19 MR. PENNINGTON: Any other comments  
20 related?

21 MR. DAY: Michael Day, Beutler Heating  
22 and Air. There's been a change from the  
23 manufacturers' standpoint in that we are now able  
24 to get a lot of EER data available, where that  
25 wasn't necessarily available to us over years

1 past.

2 And we would like to see EER be an  
3 option available within the compliance programs if  
4 that would be possible in the future.

5 Thank you.

6 MR. PENNINGTON: Thank you. Gary.

7 MR. FARBER: That reminds me. The low  
8 rise residential standards only use SEER, and  
9 obviously larger equipment. Same issue I talked  
10 about with the economizers, larger equipment.  
11 It's based on EER, but the standards don't really  
12 address that. So, for larger scale equipment that  
13 you're going to find in larger scale residential  
14 projects, multifamily, you know, with central  
15 areas that are using large mechanical systems,  
16 just want to see the ACM is an EER.

17 One other thing I talked about, air to  
18 air heat exchangers. Perhaps there ought to be a  
19 mandate for that technology. At least ought to be  
20 looked at for occupancies that have a very high  
21 ventilation load.

22 It's not something that we're going to  
23 see in residential too often, but I did do a group  
24 residential project recently. And they had a  
25 mandate of having several air changes per hour.

1 Can't tell you exactly why, but I don't know how  
2 prevalent that is. Something I'll talk about more  
3 in nonres, but it's certainly, if there is a real  
4 high ventilation load it's something that ought to  
5 be considered.

6 MR. PENNINGTON: Yes, Jim.

7 MR. MULLEN: Thank you. Jim Mullen with  
8 Lennox. Just a couple three random thoughts  
9 listening to the conversation about HVAC.

10 One is that there's probably little  
11 control over the static pressure the units end up  
12 operating at. And I think that's a two-phase  
13 thing.

14 There's a design issue, what is built  
15 into the duct system, filtration system. Those  
16 things that are external to the unit. And then  
17 how well is it installed. Are the ducts pinched  
18 off; are they the proper size. That's an issue  
19 that I hadn't heard discussed in here, but it's  
20 one that's really under the control of the  
21 installer and designer.

22 The second one is along the same line.  
23 During earlier proceedings, ARI had commented that  
24 we would love to work with the California Energy  
25 Commission on certification of installers through

1 the NATE program, particularly. The training of  
2 people is obviously very very important in  
3 achieving any of the results that you put in the  
4 standards. And the better trained people are the  
5 better the results will be.

6 The third thing is there's a lot of  
7 discussion about peak demand, and apparently a lot  
8 of work going on in the contractors to PG&E and  
9 Southern California Edison and perhaps some other.

10 You should look carefully at alternate  
11 refrigerants and peak demand. I don't think that  
12 the industry knows where alternate refrigerants  
13 and rooftop units are going to end up at this  
14 point in time.

15 And one of the issues, of course, is  
16 what happens at peak. Thank you.

17 MR. PENNINGTON: Thank you. Nehemiah.

18 MR. STONE: Can I ask a question before  
19 Mr. Mullen goes away?

20 MR. PENNINGTON: Jim.

21 MR. STONE: Jim, I have a quick question  
22 for you. You said you would support the  
23 Commission developing a program for certification  
24 of installers. Are you talking about within the  
25 standards, or are you talking about voluntary?

1 MR. MULLEN: Whatever is available.

2 MR. PENNINGTON: Any other suggestions  
3 related to residential HVAC? Okay, thank you very  
4 much.

5 Thank you very much for being so  
6 cooperative this morning. You've done a great job  
7 and we're actually three minutes ahead of this  
8 ridiculous agenda that we've got here, which is  
9 amazing. No one believed that that would be  
10 really possible to do.

11 Okay, the intent is to take a lunch  
12 break at this point and to resume promptly at  
13 1:00. So we'll start then.

14 (Whereupon, at 12:12 p.m., the workshop  
15 was adjourned, to reconvene at 1:00  
16 p.m., this same day.)

17 --o0o--

18

19

20

21

22

23

24

25

1 AFTERNOON SESSION

2 1:02 p.m.

3 MR. PENNINGTON: Okay, we are going to  
4 start the residential lighting topic. Charles  
5 Eley.

6 MR. ELEY: Okay. I'm making this  
7 presentation on behalf of Jim Binya, who is our  
8 subcontractor on lighting issues. And there's  
9 four ideas here that we want to talk about. And I  
10 know these are probably going to overlap some with  
11 some other ideas that some of you are going to be  
12 bringing up in a moment.

13 The first requirement begins to address  
14 the issue of luminaires located in insulated  
15 ceilings. And this would require that the  
16 luminaires that are located in insulated ceilings  
17 be ICAT, that's insulation in contact air tight  
18 luminaires.

19 These are available from multiple  
20 manufacturers. And that they be small wattage  
21 luminaires, 75 watts or less. This is basically  
22 about a six-inch -- or excuse me, five-inch  
23 diameter can.

24 So that's the first requirement to get  
25 at the issue of recessed cans in insulated



1       ceilings.

2               The second requirement is to require  
3       high efficacy sources for exterior lighting. The  
4       threshold of 40 lumens per watt is suggested which  
5       would permit most compact fluorescent sources in  
6       exterior lighting applications.

7               Right now the third point begins to deal  
8       with the current requirement in the standards for  
9       a high efficacy source in kitchens and bathrooms.  
10       And we want to address that language and to  
11       improve it.

12              One suggestion is to make it mandatory  
13       that high efficacy sources be installed in utility  
14       spaces, garages and places like this where light  
15       quality is, you know, is not of critical  
16       importance. Where you just need an adequate  
17       amount of illumination.

18              And then there's several other  
19       adjustments around the requirements for toilets  
20       and bath that would begin to deal with the  
21       enforceability and understanding of those  
22       requirements.

23              And then the fourth suggestion that Mr.  
24       Binya has made is to eliminate the control credits  
25       for high residences which now apply. And so those

1       are four items that are on the table that we  
2       intend to explore in more detail in the next  
3       phases.

4                   MR. PENNINGTON:   Okay, thank you.   The  
5       PG&E comments.

6                   MR. MAHONE:   Thanks.   Ours is on the  
7       slide entitled Hardwired Lighting for residences.  
8       And we have, I guess, similar goals to what  
9       Charles just talked about here which is to fix the  
10      residential lighting requirements which are fairly  
11      widely recognized as being ineffective and not  
12      that well enforced or complied with.

13                   So we're going to be considering several  
14      options here.   One of them is similar to the one  
15      that Charles just mentioned.   We're going to be  
16      looking at the possibility of requiring high  
17      efficacy sources, but the thing we're going to be  
18      looking at is the electrical code already requires  
19      certain fixtures in the residence to be hardwired  
20      fixtures.   And it will be fairly straightforward  
21      to simply require that those fixtures utilize a  
22      high efficacy source or in the alternative we're  
23      going to be exploring as a possibility allowing  
24      automatic controls such as occupancy sensors in  
25      lieu of the high efficacy sources.

1                   We're also going to be looking at  
2           possibly eliminating some of the tradeoffs the  
3           current residential code allows currently if you  
4           don't want to put high efficacy sources in  
5           bathrooms. You can instead put them in other  
6           places like garages or utility rooms. And we  
7           think those tradeoffs are, at this point, rather  
8           wrong headed, and we're going to look at it with  
9           the possibility of eliminating them.

10                   There's also confusion about how spaces  
11           like bathrooms and kitchens are defined and where  
12           the current requirements specify that switches be  
13           located, and we think that's some of the source of  
14           the problems that we're having with the current  
15           requirements. So we're going to revisit those  
16           requirements, as well, and see if we can come up  
17           with a clearer and more enforceable way to get  
18           more efficient lighting in residential buildings.

19                   That's PG&E's.

20                   MR. PENNINGTON: Okay, thank you much.  
21           I found out that the City of Los Angeles person is  
22           not coming to the meeting today, so we'll go on to  
23           Gary Farber.

24                   MR. FARBER: Gary Farber, Farber Energy  
25           Design. One simple suggestion, outdoor lighting

1 be controlled by photocells.

2 And can I ask a quick question on the  
3 insulation contact. Right now there's a  
4 requirement -- it's a mandatory requirement that  
5 incandescent fixtures be insulated in ceilings.  
6 And it doesn't apply to fluorescent. Is that  
7 something that we're addressing in this go-round?

8 MR. ELEY: The proposal that's on the  
9 table from the Energy Commission would make no  
10 distinction. The way the luminaires are  
11 manufactured is there's a housing that you specify  
12 that has the connectors to the framing members and  
13 so forth.

14 And when you specify that housing it's  
15 either an ICAT or not. And then within that  
16 housing you can put in a compact fluorescent of  
17 low voltage, any kind of luminaire that you want.

18 So the key is to make sure that that  
19 housing goes in as an air tight insulated contact.

20 MR. FARBER: So there's no reason to  
21 have a distinction between incandescent and  
22 fluorescent?

23 MR. ELEY: I don't know of one, no.

24 MR. FARBER: Okay.

25 MR. PENNINGTON: Okay, are there other

1 suggested changes related to lighting? Noah.

2 MR. HOROWITZ: I apologize; if this was  
3 covered before, stop me. Noah Horowitz, NRDC. We  
4 would like to see the way lighting is handled in  
5 the kitchen to be redone. And there are two  
6 different efforts to bring in better recessed cans  
7 in the market that's both more efficient and more  
8 reliable.

9 One of those is a PIER funded project  
10 that LBL has the lead on for a central ballast  
11 system that drives multiple cans. And one is a  
12 procurement that's underway by Pacific Northwest  
13 Labs where they've defined a better can and  
14 they're going to put up a website that should help  
15 drive the price down.

16 We also think the way some of the codes,  
17 there's tradeoff right now with the bathrooms, for  
18 example. You don't have to do the second bath,  
19 you can trade off. There are various tradeoffs in  
20 there in terms of the garage or the other spaces,  
21 and outdoor lighting, which we think is a huge  
22 energy consumer, as lights are often on 8 to 12  
23 hours a day. Those aren't mandated and we think  
24 that should be a mandatory requirement.

25 We'll submit some templates on this to

1 give you more information.

2 MR. PENNINGTON: Okay. Are there other  
3 suggestions? John.

4 MR. HOGAN: John Hogan, City of Seattle.  
5 Are parking garages, is that considered the  
6 nonresidential occupancy, or is parking --

7 MR. PENNINGTON: Yes.

8 MR. HOGAN: Okay.

9 MR. PENNINGTON: Are there other  
10 suggestions related to residential lighting? Or  
11 questions?

12 Okay, great. So we'll move on to water  
13 heating, residential water heating.

14 MR. HOESCHELE: Marc Hoeschele, Davis  
15 Energy Group. We, in 1991, were the Commission  
16 subcontractor to develop new water heating  
17 methodology. And that methodology has been pretty  
18 much in place since then. And some of the  
19 assumptions we need to take a look at.

20 The three main focuses back then on the  
21 project was to do research on usage quantities  
22 looking at different studies evaluating hot water  
23 usage residential.

24 Developing a distribution loss model  
25 which is basically an analytical model developed

1 to evaluate how much energy is lost between the  
2 water heater and the fixtures.

3 The third element was to look at energy  
4 factor, the rated energy factor and determine how  
5 the energy factor varies with load quantity.  
6 Basically the greater the load on a water heat the  
7 more efficient it will run, because the standby  
8 losses of a storage gas water heater are pretty  
9 fixed. So as you increase the load the efficiency  
10 goes up.

11 So the '92 standards incorporated these  
12 changes which provided a more detailed look at  
13 water heating and distribution loss.

14 For this go-round, for the 2003 adoption  
15 there are four areas we are going to focus on.  
16 One is looking at whether heat traps or water  
17 heater blankets would be a cost effective  
18 supplement to the NAECA standards, which are  
19 supposed to take effect in 2004.

20 There are many who think that the NAECA  
21 standards could have gone farther in increasing  
22 efficiency, so we want to explore some possible  
23 additions to increase water heating efficiency at  
24 that end.

25 The second option or area which has been

1       discussed earlier today in a larger issue is  
2       whether we should have a custom budget approach to  
3       water heating. And the multifamily situation with  
4       central water heating is kind of the example that  
5       brings that to light where if you install a  
6       central domestic hot water heating system you gain  
7       a pretty good benefit because your standard  
8       comparison is multiple storage gas water heaters.

9               So, we want to explore what we can do there  
10       as far as a custom budget approach.

11               Related to that or in that same vein is  
12       how to deal with water heating in areas where  
13       natural gas is not available. Currently again  
14       you're compared to a natural gas water heater  
15       which pretty much forces you to go for propane  
16       water heating.

17               We want to look if there's some  
18       equitable way that we can promote or work out  
19       electric water heating or heat pump water heating  
20       in these areas.

21               Along with that whole analysis we have  
22       to evaluate what features are going to remain  
23       neutral between the standard and proposed house,  
24       and which ones will be fixed.

25               We're going to reinvestigate



1 distribution loss and I think the multifamily area  
2 needs some additional work to refine that, as well  
3 as looking at insulated piping under slab for  
4 domestic hot water piping to see if that's a cost  
5 effective option.

6 And finally, we want to -- if the  
7 decision is made to proceed with the TDV approach,  
8 we need to convert the water heating algorithms,  
9 which right now are done on an annual basis, to an  
10 hourly calculation so we can look at time of use  
11 of water heating energy consumption.

12 And with that we have to see how well  
13 the algorithms will be transformed to an hourly  
14 basis which we don't think is a huge deal, and  
15 what other assumptions will be needed in the  
16 analysis.

17 So those are the four key areas.

18 MR. PENNINGTON: Okay, thank you. PG&E,  
19 water heating.

20 MR. STONE: We covered most of it  
21 earlier, but we definitely will be working  
22 together with Davis Energy Group on the  
23 multifamily model.

24 MR. PENNINGTON: Okay. SoCalGas,  
25 comments?

1                   MR. HOSLER: My name is Daryl Hosler  
2                   with Southern California Gas Company, and I want  
3                   to talk about the water heating issues,  
4                   specifically water heater blankets and heat traps.

5                   I'll admit we were a little confused as  
6                   to what the Commission is trying to do with this  
7                   issue. Water heaters are an extremely important  
8                   component to The Gas Company, and we follow issues  
9                   with them quite religiously.

10                  And we disagree with even making an  
11                  effort to try and model heat traps and water  
12                  heater blankets on gas-fired water heaters that  
13                  have just been improved by five full percentage  
14                  points through the DOE process. And have to meet  
15                  flammable vapor ignition resistance requirements  
16                  and 10 nanogram per joule NOx requirements in the  
17                  southern California area. And of which those of  
18                  us who are not manufacturers of water heaters  
19                  don't even know what those things look like.

20                  So, for somebody to say we think the  
21                  NAECA standards aren't stringent enough and that  
22                  you ought to add water heater blankets and heat  
23                  traps, you are venturing into a safety area, and  
24                  I'm telling you that right now, without any  
25                  knowledge. Because even I don't know what these

1 water heaters will look like in 2005 that have to  
2 meet all these other requirements.

3 I think that .67 water heaters in  
4 southern California's territory, at least, are  
5 very good for our customers. We know that they  
6 will work in that area, even though in other areas  
7 they may not do so well.

8 And to try and go that last mile for 1.8  
9 or 1.5 percentage points makes no sense to us.  
10 And we will continue to comment on this issue as  
11 this process goes forward. And I would think that  
12 looking forward, as the wealth bubble continues to  
13 evaporate, there may be better places to put the  
14 Commission's time and money into looking for  
15 energy savings.

16 MR. PENNINGTON: Okay, thank you. Steve  
17 Gates.

18 MR. GATES: Thank you. I had a few  
19 brief comments on hot water systems in residential  
20 buildings.

21 The first one has to do with -- it's  
22 indirectly related to distribution losses and it  
23 has to do with the sizing of the hot water piping  
24 in a residence.

25 The piping is sized in accordance with

1 the Uniform Plumbing Code. More than a decade ago  
2 I looked into the sizing assumptions that the pipe  
3 sizes in the UPC use, and at the time I concluded  
4 that the criterion being used for delivery through  
5 this piping was on the average of seven gallons  
6 per minute per fixture.

7 Now, the problem with that is California  
8 mandates low flow fixtures. So you have, the  
9 basic problem you then get into is you have a  
10 faucet or a shower that passes what, between 1 and  
11 2.5, 3 gallons per minute maximum, coupled to a  
12 pipe that with diversity factors for multiple  
13 fixtures and may be sized to deliver 10 to 15 or  
14 more gallons per minute. And so you turn it on  
15 and you then wait forever for the water to show  
16 up.

17 So, you know, one very easy thing to do  
18 would be to review the sizing requirements that  
19 the state needs to use, you know, to recognize  
20 that we don't, you know, particularly on the hot  
21 water side we don't need 7 gallons per minute per  
22 fixture. We don't want 7 gallons per minute per  
23 fixture, so why size the piping to deliver that?

24 Next slide, please. Kind of a related  
25 issue. This has to do with kitchens and

1 dishwashers where you have intermittent draws over  
2 the course of an hour or so. With the piping out  
3 to the kitchen uninsulated what's very common with  
4 dishwashers is by the time the dishwasher is ready  
5 to draw another load of water, the water that's  
6 already in the pipe has cooled down.

7               So, for dishwashers to effectively  
8 remove grease you need water at least 120 degrees,  
9 manufacturers recommend on the order of 140  
10 degrees. The vast majority of dishwashers, even  
11 if you set the water heater at 140, don't get 140-  
12 degree water, because you've got an oversized  
13 pipe, uninsulated, sitting there full of water,  
14 particularly if it's under the slab, it can be  
15 stone-cold by the time the dishwasher is ready to  
16 draw it again. And so you severely impact the  
17 efficacy of the dishwasher.

18              So, clearly this ties into the first  
19 recommendation. One, make the pipe smaller. Two,  
20 at least for the dishwasher run, you know, the  
21 kitchen run, insulate the pipe.

22              Next slide, please. This one's kind of  
23 picky, but basically an observation I see, you  
24 know, looking at my family all the time. If you  
25 have a house full of mixing faucets, the faucet is

1 almost always in the middle position. So every  
2 time you draw water out of it, whether it's for a  
3 glass of water or to wash your hands or whatever,  
4 you're actually pulling a mixture of hot and cold  
5 water down the pipe. The water never gets there  
6 because you drew enough for a glass or water or to  
7 wash your hands, and by the time the water  
8 actually starts to warm up you've shut off the  
9 faucet.

10 So, aside from kitchens where you may be  
11 doing, you know, intermittent draws on a sink and  
12 you want to be able to quickly temper hot and cold  
13 water, I think it makes a lot of sense to  
14 investigate whether single level faucets are what  
15 we want in California in terms of a lot of these  
16 fixtures.

17 Next slide, please. One final comment  
18 on just particularly multifamily distribution  
19 systems is my experience from looking at these  
20 systems is that the losses, the distribution  
21 losses are a major component of the overall usage.

22 I think you're on the mark in  
23 identifying this as an area to be investigated.  
24 Just comments on that: The DOE2 program is  
25 capable of modeling losses off recirculation

1 systems, and the people who have actually  
2 attempted to model those are usually call and ask  
3 what's wrong with their run because the losses are  
4 far huger than they ever imagined. And they think  
5 there's something wrong with the program. Where,  
6 in reality, there's something wrong with the  
7 distribution system.

8 Those are my comments.

9 MR. PENNINGTON: Thank you, Steve, very  
10 much. Gary.

11 MR. FARBER: Gary Farber, Farber Energy  
12 Design. Tankless water heaters, I'd like to get  
13 to the bottom of how efficient those are. And if  
14 certain models or certain technologies, especially  
15 if they've got intermittent ignition, things like  
16 that, are efficient enough I'd like to see that  
17 added to the definition of a standard water  
18 heater.

19 I'm often dealing with residential  
20 customers or architects that they haven't decided  
21 yet what the water heater is going to be, and  
22 unfortunately if we model it as a standard water  
23 heater right now, they don't have the choice of  
24 using a tankless water heater. And I'd like to,  
25 you know, open that up so they can, you know, make

1       that choice further on.

2               And if they are, indeed, as efficient as  
3       some manufacturers are saying, I think we ought to  
4       encourage them. And including them in the  
5       definition of standard water heater can do that.

6               Multifamily reference, probably talked  
7       about that a little bit, but with the difference  
8       in energy budgets between individual water heaters  
9       and central water heaters one possible fix is to  
10      say the reference building will have the same  
11      system type as your proposed building, either  
12      individual or central. So we're not having such a  
13      big disparity between the standard water heater  
14      energy and the proposed.

15              Recirculation controls, kind of talked  
16      about that somewhat. I think we need to look at  
17      how the number of units impacts the efficiency, or  
18      the energy savings of various controls, time and  
19      temperature controls on the recirculation system.

20              MR. PENNINGTON: What do you mean the  
21      number of units?

22              MR. FARBER: The number of dwelling  
23      units. As the number of dwelling units increases  
24      intuitively one would think that the effect of the  
25      controls is going to lessen because the water is



1       being used more anyway. So have less impact.

2               Electric water heating. This probably  
3       isn't going to come up much, but there can be  
4       instances in small multifamily where with  
5       individual systems where some units may have  
6       electric and some gas. And the same thing I  
7       brought up on space heating. I think maybe we  
8       ought to just say you can't mix systems because  
9       the building overall may pass the energy code, but  
10      it does impact the individual unit occupant who is  
11      paying the bills, you know. So I think another  
12      issue of equity in energy.

13             And combined hydronic systems plus  
14      recirculation. I think the residential ACM  
15      doesn't currently allow you to model combined  
16      hydronic systems with the recirculation energy.  
17      So that needs to be looked at when you have  
18      recirculation systems.

19             MR. PENNINGTON: Okay, thank you. Dave,  
20      is Dave Ware here?

21             MR. WARE: Dave Ware, Owens Corning;  
22      Manager of Codes and Regulation.

23             I think some of the previous comments  
24      have already alluded to the fact that the water  
25      heating compliance method is probably one of the

1       most complicated sections of the code.

2               And as Marc pointed out, the work that  
3       was done by Davis Energy Group in '91 really  
4       helped, at least, establish the intricacies of the  
5       distribution losses and the standby losses and the  
6       loads and all those kinds of things.

7               But in so doing, while we got a handle  
8       on water heating it became obvious that water  
9       heating was a very disproportionate element of the  
10      overall total energy budget for a given home. In  
11      fact, in many houses it overwhelms the total  
12      budget. It is the predominate element.

13              And because of that my suggestion is  
14      that we need to limit the tradeoffs ability that  
15      we currently allow for water heating into other  
16      elements.

17              One suggestion would be is we simply  
18      establish a separate budget. We could establish a  
19      separate budget for water heating as we do for the  
20      envelope things, and that would eliminate some of  
21      the gamesmanship that's going on.

22              A minimum energy factor that is used,  
23      that is allowed by NAECA, typically is not even  
24      provided in a distribution or supply house anyway.  
25      So the builder is getting an energy credit right

1 off the get-go for doing nothing more than buying  
2 what he or she can get off the shelf.

3 And it's really unfair that that energy  
4 credit then gets transferred back into another  
5 element of the building envelope with no  
6 discernible energy savings to the consumer, to the  
7 State of California.

8 So my suggestion is that we really  
9 consider the overall energy budget or a possible  
10 separate energy budget for water heating in  
11 particular because of the various elements that  
12 are a portion of that total budget so we could  
13 eliminate some of the trading that's going on.

14 MR. PENNINGTON: Okay, thanks, Dave. Is  
15 Brian Prager here? Okay, we did get some late  
16 comments from Brian Prager, so I was going to give  
17 him a chance to come up next.

18 All right, Michael, do you want to make  
19 comments?

20 MR. DAY: Michael Day, Beutler Heating  
21 and Air. As one of the largest HVAC builders in  
22 California of multifamily housing, one thing that  
23 might want to be considered by those who are  
24 looking at the distributed and centralized water  
25 heating systems is that the vast majority, and

1       just a sort of off-the-cuff guess would be in  
2       excess of 95 percent of the multifamily units that  
3       we've been building over the last few years have  
4       used hydronic water heating systems.

5               And in a distributed system we're  
6       allowed to tap off of that, recircuit, bring it  
7       back to the tank without needing to provide an  
8       entirely separate loop of piping for the hydronic  
9       heat that allows the builder to get away from the  
10      expense of having to put in an additional furnace.

11             And if you went to a centralized system  
12      as opposed to the distributed system there would  
13      be a significant burden on builders having to add  
14      furnaces or provide an extra boiler and an extra  
15      piping system to take care of the hydronic heat.

16             Thank you.

17             MR. PENNINGTON: Thank you. All right,  
18      are there other suggested changes related to  
19      residential water heating? Come up, sir.

20             MR. STANONIK: Frank Stanonik with the  
21      Gas Appliance Manufacturers Association. One  
22      comment and then a question.

23             On the issue of looking at insulating  
24      blankets, the summary of the key topics that came  
25      out with the workshop notice indicated that the

1 equipment used in California is typically more  
2 efficient than federal minimums enabling other  
3 cost effective measures to be degraded and so on.  
4 You can read that.

5 My point is first of all that come 2004  
6 the equipment in California that will be installed  
7 then will probably not be any more efficient than  
8 federal minimums.

9 But more importantly the reason that  
10 this statement is true today is, in fact, because  
11 the Title 24 regulations motivated the builders to  
12 install more efficient equipment because they  
13 didn't want to put a blanket on. They didn't want  
14 to mess with an insulating blanket. It was not a  
15 desired feature. And I think it may not be a wise  
16 use of resources to look at it.

17 My question is in the discussion of the  
18 TDV the question of hourly load or hourly modeling  
19 of water heater usage, I'm very confused as to why  
20 that matters. Because in a typical residence if  
21 you have a gas water heater your total burner on  
22 time for the whole day is probably less than two  
23 hours.

24 And so if you're looking at an hourly  
25 modeling, the off time is incredibly, you know,

1       overwhelms the on time. And I just don't see how  
2       that fits into a TDV kind of scheme.

3               MR. PENNINGTON: Want to respond?

4               MR. ELEY: Hi, Frank.

5               MR. STANONIK: Hi, Chuck.

6               MR. ELEY: With regard to TDV I suppose  
7       if we did what Dave Ware suggested and made the  
8       energy budget separate that it would not be  
9       necessary maybe to have an hourly calculation.

10              As it is now though, and if we went to  
11      TDV we would need to break down all components of  
12      energy use to an hourly basis so that we could  
13      apply the multipliers on each hour. That's the --

14              MR. STANONIK: I guess what I'm trying  
15      to get at is it seems to me if you did that, if  
16      you went and tried to work out that scheme, the  
17      fact is when you get to water heating I think it's  
18      going to be a very circumstance where a homeowner  
19      actually has -- their usage will be in some  
20      fraction of the hour, not, you know, -- so it's  
21      going to be a very -- the benefit of the lower  
22      fuel rate because of the TDV just seems like --  
23      well, I guess you need to do it to find out.

24              MR. ELEY: You need to do it. I think  
25      what most of the data shows is that there's, with

1 water heating there's a morning peak and an  
2 evening peak, an early evening peak. And, you  
3 know, we all know what the curve looks like.

4 And basically I think what would likely  
5 happen with water heating is we're just going to  
6 prorate the energy use along some curve like that,  
7 that we've got some data on.

8 MR. STANONIK: Okay.

9 MR. PENNINGTON: Mike, did you -- yeah,  
10 you're all on the same team, so --

11 UNIDENTIFIED SPEAKER: Okay, we're done,  
12 then.

13 (Laughter.)

14 MR. HOROWITZ: Noah Horowitz, NRDC.  
15 Just a reminder of the earlier comment on HVAC  
16 that as the NAECA standard kicks in in 2004 we  
17 need to change our modeling assumptions on the  
18 base case.

19 MR. ELEY: Right.

20 MR. HOROWITZ: Because right now that  
21 incremental difference is being traded off, and  
22 that would be eliminated.

23 MR. PENNINGTON: Okay, thank you. Yes,  
24 sir.

25 MR. PLAISTED: This is Josh Plaisted, a

1 Design Engineer with SunEarth, Incorporated, a  
2 solar thermal manufacturer here in California.  
3 And we seem to be getting a lot of press and more  
4 business as of late.

5 And part of what we've been doing as the  
6 market grows here in California is trying to get  
7 what have been sort of disparate standards and  
8 incentives for solar that have existed over the  
9 decade, or longer, actually in line with what the  
10 market's currently doing right now.

11 As far as the residential systems go,  
12 there is a package solar thermal rating called  
13 OG300 by the Solar Certification Corporation, the  
14 SRCC. And that is very well and in line with  
15 Title 24. Title 24 is actually developed around  
16 that standard.

17 So if you are a builder you can pretty  
18 much pick up one of these package systems. It  
19 meets Title 24. It now meets IATMO, that is  
20 their, what say package system listing  
21 certification. And also the proposed grant  
22 program SB-1345, which is \$750 rebate.

23 It is quite different though in an  
24 emerging market segment that is very promising  
25 which is multifamily dwellings that can have as



1       little as a two- to five-year payback.

2               What's currently, as I understand it,  
3       Title 24, how that's currently taken care of is  
4       it's assumed that multifamily dwellings are really  
5       like multiple residences, i.e., it would require  
6       multiple individual package systems, which if you  
7       operate off a central boiler and a recirc loop,  
8       does not reflect how the system's installed that  
9       we'd packaged the solar thermal with.

10              So actually for that growing market  
11       segment we'd like to see the CEC in Title 24  
12       develop around what actually happens in the system  
13       design types that have the high paybacks, those  
14       which are centralized solar systems off large ASME  
15       code tanks.

16              So hopefully we'd like to work with the  
17       CEC, both myself as SunEarth, and also as a  
18       representative from the California Solar Energy  
19       Industry Association, CALSEIA, to work with the  
20       CEC and bring the commercial guidelines, or  
21       multifamily guidelines in line with how systems  
22       are currently produced and installed.

23              Thank you.

24              MR. PENNINGTON:   Thank you.   Mike.

25              MR. GABEL:   Mike Gabel, Gabel

1 Associates. Just to follow up on what the other  
2 gentleman said, we're actually starting to see  
3 people putting in solar collectors in a way in  
4 which they want to get credit under Title 24,  
5 which we haven't seen in many years.

6 I'd like to recommend to the Commission  
7 they either establish a system where someone  
8 doesn't have to do an FChart analysis, can use a  
9 straight rating from the equipment to establish a  
10 net solar fraction. Or release a public domain  
11 compliance version of FChart which we don't use  
12 much, but may in the future become much more, you  
13 know, important.

14 So, that's my comment.

15 MR. PENNINGTON: Are there other  
16 comments for suggested changes related to  
17 residential water heating?

18 Okay, very good, thank you.

19 That brings us to the nonresidential  
20 standards area. And we'll start with envelope.

21 MR. ELEY: Yes. There's really only one  
22 topic that we intend to look at on nonresidential  
23 envelope. And that's the issue of insulation over  
24 T-bar ceilings.

25 There was a restriction on this in the

1 '92 standards. I believe it was removed in '95.  
2 ASHRAE standard 90.199 does not allow the T-bar  
3 ceiling to be used as the building envelope.

4 And there's several research projects  
5 funded by the Commission's PIER program that are  
6 addressing this issue. So, what we intend to do  
7 here is to learn from these research projects, and  
8 to propose some changes to the standard that deal  
9 with this.

10 We're not sure whether it would become a  
11 restriction again, or whether it would be a  
12 different modeling assumptions for the case when  
13 insulation is installed over a T-bar ceilings.

14 Doug, do you or your group want to add  
15 any more to this?

16 MR. MAHONE: No, I think you pretty well  
17 said it.

18 MR. ELEY: So that's all we're looking  
19 at. Now, there was some big envelope changes that  
20 were made with regard to nonresidential  
21 fenestration in the 2001 update. And we will  
22 probably make some minor adjustments to those as  
23 needed to address compliance difficulties. But we  
24 don't see biting off any other big issues.

25 MR. PENNINGTON: Okay, thank you. PG&E.

1                   MR. MAHONE: We've got two people who  
2                   are going to speak on this. I'll start with Misti  
3                   Bruceri, who's going to talk about cool roofs.  
4                   And then pass on to Steve Blanc. Or do you want  
5                   to do it the other way? Take it away, Misti.

6                   MS. BRUCERI: Misti Bruceri with Pacific  
7                   Gas and Electric Company. And we are working with  
8                   LBNL and our proposal is to move cool roofs from a  
9                   compliance credit to a prescriptive requirement  
10                  for flat roofs. And that would be in all climate  
11                  zones that are dominated by cooling energy and  
12                  wherever the analysis deems appropriate that  
13                  breaking point is.

14                  Most of our analysis will apply -- all  
15                  of it will apply to flat roofs, and most of it  
16                  will apply only to nonresidential occupancies.  
17                  However, we realize there will be some overlap  
18                  with some residential occupancies, especially the  
19                  multifamily buildings. And we're hoping that some  
20                  of that analysis will be available for further  
21                  research in the residential areas.

22                  What we'd like to do is expand upon our  
23                  analysis that was completed for the 2001  
24                  standards, and try to resolve some of the  
25                  outstanding issues therein.

1           Some of those would be the accuracy of  
2           the modeling software. And the current algorithms  
3           that we use to do the modeling. We will analyze  
4           the current calculations and then we hope to make  
5           some recommendations to make those -- that make  
6           them more accurate.

7           Another issue is the various HVAC system  
8           configurations that might be right directly  
9           beneath the roof. And so we're going to do some  
10          analysis to analyze the various effects that cool  
11          roofs might have on those.

12          And then finally evaluate the effect on  
13          the cool roof application using TDV.

14          Thank you.

15          MR. PENNINGTON: Can I ask you a  
16          question about the HVAC configuration? Are you  
17          imagining that there would be a different -- I'm  
18          not quite sure I understand that.

19          MS. BRUCERI: Depending on the  
20          configuration under the roof, whether there is a  
21          ductless system or a return air plenum or a ducted  
22          system, we would like to see the various effects  
23          that that may have on the cool roof credit and the  
24          savings.

25          MR. PENNINGTON: Okay.

1                   MR. STONE: Bill, can I ask a question?  
2           Misti, are you including the ducting system that's  
3           on top of the cool roof as comparison against on  
4           top of black roofs, too?

5                   MS. BRUCERI: I don't believe we've  
6           included that at this point. But we are still  
7           open to some suggestions there.

8                   MR. PENNINGTON: And, Steve, were you  
9           next?

10                  MR. BLANC: Sure. Steve Blanc, PG&E.  
11           I'm going to talk about several issues here,  
12           starting with the nonres modular classroom. This  
13           is a very large market in California. We think  
14           there are at least 10,000 units per year being  
15           built.

16                  These are manufactured units. They're  
17           brought onsite at schools. In fact, most of the  
18           school people I've talked to, including the ones  
19           my kids go to in Vacaville, they tell me that they  
20           are not expecting to build new classrooms on a  
21           permanent basis, they'll all be portables.

22                  And so we have had pilot programs, both  
23           by our company and Edison, rebating and working  
24           with both the state and the school districts to  
25           improve the energy efficiency of these buildings.

1                   There is also some ongoing research at  
2           Lawrence Berkeley National Labs that we hope to  
3           tap into. There are a lot of measure  
4           opportunities for them. Insulation, cool roofs,  
5           radiant barriers, high performance windows, high  
6           efficiency lighting. Basically it's making sure  
7           the T8, the electronic ballast systems are  
8           installed at the very least. Skylights; and last,  
9           but not least, and not on the slide, are looking  
10          at high efficiency heat pumps and air conditioning  
11          units.

12                   The next part of this is existing  
13          buildings. We are looking at trying to capture  
14          the large existing building potential in much the  
15          same way as has been discussed with residential.

16                   We're looking at -- examining the  
17          feasibility on replacement where most Title 24  
18          kicks in when you have to do a large rehab of a  
19          building. We want to look at whether or not it's  
20          more feasible to require higher efficiency upon  
21          replacement of particular components such as  
22          windows, HVAC systems, ducts, those kind of  
23          things.

24                   I think the less likely requirement  
25          would probably be on the sale of the building.

1       The former seems to be, in my mind at least, much  
2       more enforceable. But we're going to look at both  
3       of them.

4               And we would require an upgrade to  
5       existing equipment upon sale of the building.  
6       And, again, it's similar to the residential  
7       effort.

8               And that's it.

9               MR. PENNINGTON: Okay, thank you. All  
10       right. John.

11              MR. HOGAN: John Hogan, City of Seattle.  
12       I submitted my comments electronically. Copies of  
13       those were available on the table outside. So you  
14       can follow along with those.

15              I'm going to address three key issues,  
16       NFRC certification, U factor calculations such as  
17       for opaque assemblies, and alterations to existing  
18       buildings.

19              In terms of NFRC, we're recommending  
20       that section 116 be revised to require that  
21       fenestration in all nonresidential buildings be  
22       certified in accordance with NFRC rating  
23       procedures, not just buildings over 100,000 square  
24       feet.

25              And I know there will be more discussion



1 of this, but just to add a point that to note that  
2 the IECC requires this certification to the NFRC  
3 standards for all size buildings. And also both  
4 the 1999 and 2001 versions of ASHRAE standard 90.1  
5 require the same. So we're encouraging California  
6 to get in line with these national procedures and  
7 standards.

8 There are a couple of other nuances  
9 regarding NFRC. Another subsection of section 116  
10 allows calculations to be done for solar heat gain  
11 coefficient. Those should be done with reputable  
12 values. So those should be from SHGC values from  
13 the NFRC spectral data files. That information is  
14 available, virtually all the glass manufacturers  
15 have data in there. So we should be using good  
16 numbers if people are taking that approach.

17 Similarly, there's a credit in table 1-D  
18 for low E coatings. Those should be reputable  
19 values, so it should also be from the NFRC  
20 spectral data files.

21 And there's another section 141 that  
22 talks about visible light transmittance. For  
23 consistency, and again to have values we can  
24 trust, visible light transmittance values should  
25 also be certified in accordance with NFRC.

1                   And I think you can probably move that  
2           requirement in section 141 into 116 along with the  
3           rest of the requirements there.

4                   In terms of requirements, there's a  
5           portion of section 141 that has calculation  
6           procedures for U factors for opaque assemblies.  
7           And we're recommending that those U factors be  
8           determined in accordance with ASHRAE standard  
9           90.1, using appendix A. It provides much more  
10          detail than is included in the current Title 24  
11          and has example tables with precalculated values.  
12          We think that makes for more consistency and  
13          simpler compliance.

14                  And while I'm on the subject of  
15          consistency, there are a number of references that  
16          need to be updated throughout the standard. A lot  
17          of references to the 1993 handbook of  
18          fundamentals, for instance. ASHRAE updated that  
19          in 1997 and again in 2001. So we should be using  
20          current information.

21                  Then I wanted to talk about alterations  
22          and spend a little more time and touch on it from  
23          a slightly different angle than the previous  
24          speaker.

25                  We think there should definitely be

1 requirements in the standard for alterations to  
2 existing buildings. The Seattle Energy Code and  
3 Washington State Energy Code have had requirements  
4 in there from the beginning in the '70s.

5 Two primary reasons: One, obviously  
6 there's a lot of potential in existing buildings  
7 and lots of alterations worked on. But we also  
8 had people who were doing new construction come to  
9 us during the code development process saying, we  
10 want a level playing field, you know, if you're  
11 making us do stuff officially in new construction  
12 why aren't you making people do something  
13 comparable in existing buildings.

14 UNIDENTIFIED SPEAKER: That's a shocker.

15 UNIDENTIFIED SPEAKER: That's a good  
16 idea.

17 UNIDENTIFIED SPEAKER: Nobody said that,  
18 did they?

19 (Laughter.)

20 MR. HOGAN: Well, it's pretty  
21 straightforward, you know. You take a window out  
22 of an existing wall, you've got an opening in a  
23 wall and you're putting a new window in. What's  
24 the difference between it's an existing building  
25 on this lot, or next door it's a new building

1       that's got the same rough opening.

2               Same thing for opaque elements. You  
3       have an open cavity, you should be filling that  
4       with insulation when it's open.

5               People start to raise all sorts of  
6       questions about what about this or what about  
7       that, or lots of reasons why you don't want to do  
8       it for existing buildings.

9               I think there needs to be some  
10       qualifiers, but with the 20 years of experience  
11       we've had I think you can have sort of a half  
12       dozen exceptions that deal with key cases, and  
13       make this work fine.

14              So, for instance, it's always fine to  
15       install storm windows. It's okay to replace glass  
16       in the existing sash and frame with something  
17       that's equal or comparable. Once you change the  
18       sash or the sash and the frame, then you need to  
19       upgrade it.

20              For solar heat gain coefficient you can  
21       replace that with something that's equal or  
22       comparable.

23              For these cavities, make sure you fill  
24       any cavities you open with insulation, but the way  
25       it's been applied in Washington State, essentially

1       whatever you touch. So if you've got three walls  
2       of a building, you just open up the cavities on  
3       one side, you only fill those with insulation.  
4       There's nothing that triggers you to do everything  
5       on the rest of the building.

6               So the concept is after you've done 127  
7       alterations you've opened all the cavities, and  
8       you've brought the whole building up to code.

9               There's also an allowance that if you  
10      have a masonry building and it doesn't have  
11      cavities you're not required to build that out so  
12      it would meet the new construction requirements.  
13      If you add a cavity you need to fill it, but you  
14      don't need to build it all the way out.

15              And some similar thoughts about roofs.  
16      You're allowed to add roof membranes until you get  
17      up to about three layers. And once you get to  
18      three layers then you need to strip it all off and  
19      start over again. It's fine to add those layers,  
20      but once you have to strip off all the layers,  
21      then you need to insulate at that point before you  
22      put the roofing membrane back on.

23              So, I'm sure there will be more  
24      discussion of this, but we encourage the CEC to  
25      move ahead and give very serious consideration to

1       this issue.

2                   Thank you.

3                   MR. PENNINGTON:   Okay, thank you very  
4       much.   Dave Ware.

5                   MR. WARE:   Dave Ware, Owens Corning;  
6       Manager of Codes and Regulation.   In last year's  
7       procedure under AB-970 the 2001 process there was  
8       a major effort to bring the nonresidential  
9       fenestration U values up to the ASHRAE level.   And  
10      what I'm advocating is that we do the same thing  
11      for the envelope requirements.

12                  Right now the prescriptive requirement,  
13      prescriptive package in the nonresidential  
14      standards, the minimum wall R value that's  
15      allowed, just as an example, is R-11.   If taken  
16      the ASHRAE standard it would be R-13.   If you even  
17      take a look at the tier 2 ASHRAE levels you would  
18      even find more savings where there's considerable  
19      work already done on cost effectiveness and things  
20      of that sort.

21                  So, I think really it's also a shame  
22      that we have not taken a look at the envelope  
23      requirements for nonresidential buildings, as last  
24      year's process, and again in this process.   I  
25      think that we need to do that.

1 Thank you.

2 MR. PENNINGTON: Thank you. Is Eric  
3 DeVito here?

4 MR. DeVITO: Eric DeVito, Cardinal Glass  
5 Industries. The point we're speaking on this  
6 right now is with regard to NFRC certification in  
7 general, but in specific to nonresidential  
8 buildings. And I'd like to echo the sentiment of  
9 John Hogan.

10 You know, one of the initial reasons  
11 prompting this suggestion to review the NFRCs and  
12 defaults is that exception for building size, the  
13 100,000 square feet and 10,000 square feet of  
14 glazing. We think the push should be away from  
15 defaults and exceptions in those particular cases,  
16 more towards the NFRC rating system and labeling  
17 system that's in place just to take advantage of  
18 that in both nonresidential and residential, but  
19 in particular we raise the point of the one that  
20 John Hogan exactly made.

21 And, you know, there is some -- the  
22 other point I would like to raise is there is a  
23 good bit of time now before the next standards  
24 take place. We have till 2005 so there is a nice  
25 bit of time in order to get these, the NFRC

1 processes that are needed for this sort of change  
2 to take place, in place in the next several years.  
3 And to counter any resistance that may exist,  
4 although we don't foresee much.

5 Thank you.

6 MR. PENNINGTON: Gary.

7 MR. FARBER: Gary Farber, Farber Energy  
8 Design. Issues, one is west glass area  
9 regulation, same issue I brought up with regards  
10 to low rise residential prescriptive compliance.  
11 There's no regulation over the maximum west facing  
12 glass area, only over all west area.

13 And the same thing occurs in  
14 prescriptive nonresidential buildings. Glass area  
15 is regulated as a function of the entire wall  
16 area, but you can put all that glass on the west  
17 side if you so want to right now. And I think  
18 there should be a -- we should look at, you know,  
19 putting some limits on how much west facing glass  
20 there can be just to deal with the peak load  
21 issue.

22 We were dealing with the high rise res  
23 this morning, or does that fall under this non  
24 res --

25 MR. PENNINGTON: Yes, it does. High



1 rise res falls under the nonresidential.

2 MR. FARBER: Okay. We are talking about  
3 it now, okay. So, in high rise res the -- and  
4 Charles talked about this a little bit, I think,  
5 about the solar heat gain coefficients, they were  
6 tremendous changes in the high rise residential  
7 fenestration requirements. And I think that that  
8 needs to be relooked at in terms of how those very  
9 low -- coefficients impact winter heating needs of  
10 high res residential units. And I think that's  
11 general.

12 But specifically I think we may want to  
13 look at having two different -- two tiered  
14 standard. One for buildings that are air  
15 conditioned, and one for buildings that are not.  
16 At least buildings that have central heating  
17 systems that have no air conditioning.

18 If we can assume that buildings like  
19 that retrofit air conditioning would be very  
20 unlikely, or at least for building types, I should  
21 say, where it is very unlikely that air  
22 conditioning would be retrofit, perhaps a very low  
23 coefficient is really doing the service to us,  
24 because we are obviously increasing heating energy  
25 and heating costs. I think, take a look at that.

1                    Skylights, the 2001 standards have some  
2                    new things going on with curves and varying the  
3                    standard based on the type of glass, whether it's  
4                    plastic or glass. And I think it's created some  
5                    big problems. You calculate a glass skylight and  
6                    they decide to change it to plastic or vice versa,  
7                    even if the system's more efficient you still have  
8                    to recalculate the building because the reference  
9                    has changed.

10                    So I'd like to see skylights based on a  
11                    single reference point like they have been in the  
12                    past, get back to that. We can argue about what  
13                    that ought to be, but whatever it is, let's just  
14                    have a fixed point so we don't have to be redoing  
15                    calculations if they decide to change the type of  
16                    glazing.

17                    Insulation requirements. We've got  
18                    minimum insulation requirements for low rise  
19                    residential buildings. We don't for  
20                    nonresidential buildings. And there is some  
21                    concern about what people do in performance  
22                    compliance, and whether they're playing games and  
23                    doing things right.

24                    And I think one way to address part of  
25                    that is to put some mandatory minimum insulation

1 levels in so we don't see buildings with very low  
2 roof insulation, or raised floor over parking  
3 insulation. Doesn't happen a lot, but it happens  
4 on occasion. I see it.

5 Operable windows. Maybe we should look  
6 at a credit for operable windows that have some  
7 type of interface with a mechanical system to open  
8 the window and it turns off the mechanical.  
9 Nothing in the standards addresses that right now.

10 I'd like to encourage operable windows,  
11 but I don't want to see the energy waste of the  
12 mechanical systems. So if we can address that,  
13 that would be good.

14 Talked about T-bar ceilings already.  
15 Exterior doors. Exterior doors used to be part of  
16 our calculations, and I think they went away back  
17 in '92. I'd like to see that get back into the  
18 model. Because right now in a retrofit situation  
19 if you take out opaque doors and put in glazing,  
20 you get hit pretty hard, which isn't really fair  
21 because there actually was an opaque door there  
22 which isn't as efficient as an insulated wall  
23 anyway. But it creates somewhat of a problem  
24 there. I think it would just be more realistic to  
25 get back into modeling our doors again in

1 nonresidential buildings.

2 The last thing is I think we ought to  
3 consider extending envelope requirements to I  
4 occupancy buildings and to buildings that fall  
5 outside of the human comfort range.

6 That's it.

7 MR. PENNINGTON: Okay, thank you. Are  
8 there any other suggested changes related to  
9 nonresidential envelope? Let's see, yeah, I  
10 thought you might want to have something to say.

11 (Laughter.)

12 MR. PENNINGTON: Hi, Jerry.

13 MR. BLOMBERG: Hi. I'm Jerry Blomberg  
14 from SunOptic Skylights. And for 30 years I've  
15 been an advocate of the benefits of daylighting in  
16 buildings. And now the evidence is in that says  
17 daylighting is probably the most important part of  
18 the envelope that you can get.

19 I have a couple of examples to use. One  
20 is the -- Project that was built under PG&E's  
21 program that CSAA, California Automobile  
22 Association in Antioch, California. And Charles  
23 is familiar with it, he was the consultant on it.

24 After the building was occupied -- for a  
25 period of a year after it was occupied, PG&E

1 monitored the building energy components. And at  
2 the end of the monitoring they published a  
3 document that gave the amount of energy that was  
4 saved by each component.

5 And I'd like to read what their numbers  
6 were, what they published. And that was that the  
7 signing and making it a one-story building with  
8 daylighting saved 37.9 percent of the base case  
9 building.

10 And then after that they accumulated all  
11 of the other energy benefits, and they include  
12 energy efficient office equipment in that deal.  
13 And so since it was accumulated it's difficult to  
14 see what part each one of these elements played.  
15 So I broke it down, just separated it out.

16 And the HVAC system customized direct  
17 digital controls and high efficiency supply fans  
18 saved 9.9 percent of the base case building.

19 The energy efficient office equipment  
20 saved 15.3 percent. The HVAC system, adding  
21 variable speed compressors, saved 2.7 percent.  
22 Light colored building, shade trees, nonconductive  
23 window assemblies, enhanced blinds, advanced water  
24 heating and flow control devices saved 3.4  
25 percent. High efficiency lighting system with

1 occupancy sensors saved 2.9 percent.

2 For a total of 34.2 percent. For all  
3 the other items other than the daylighting.

4 Now if you take out the energy efficient  
5 office equipment which we don't have any control  
6 over here in the standards, it would end up that  
7 the daylighting saved 44.7 percent, and all the  
8 other efficiency parts combined saved only 22.3  
9 percent.

10 So the daylighting was twice as  
11 important as all the other energy efficiency  
12 things in the building.

13 Now, if we don't get the daylighting in  
14 a base case building in the standard, then a  
15 designer could get compliance using an energy  
16 budget by just daylighting and having lighting  
17 controls in the building, and ignore all the other  
18 things that weren't mandated. So somehow it needs  
19 to get into the deal.

20 A second case which you may or may not  
21 be aware of is that about five years ago the  
22 WalMart Stores decided to investigate daylighting  
23 their supercenters. And so -- well, actually they  
24 started in Lawrence, Kansas, and they just put  
25 half the building in daylight with skylights and

1 half the building without.

2 They found that the merchandise sold  
3 faster in the daylighted section. And to verify  
4 that they moved inventory from one part of the  
5 building to the other and the same thing happened  
6 when they moved it.

7 So, over the last five years they've  
8 built about 500 stores that are daylighted. And  
9 they use TA lamps, dimmable ballasts. And when  
10 there's enough daylight they switch the lights off  
11 all together.

12 Now, based on that they have reduced  
13 peak demand in the stores they built by more than  
14 130 megawatts. And so from a peak reduction point  
15 of view it's hard to beat something that takes the  
16 lights off all the way in a building.

17 So, then if you look at the life of the  
18 store, say 20 years, the cost of replacing the  
19 energy that they saved when they turned the lights  
20 off amounts to less than 1 cent a kilowatt hour.  
21 So from a cost effectiveness point of view it's  
22 hard to beat.

23 And so, anyway, I recommend that we  
24 either get it as a mandated item or a prescriptive  
25 item, and identify the buildings that it would be

1       appropriate in.

2                   Thank you.

3                   MR. PENNINGTON:   Thank you.   Are there  
4       other suggested changes related to the nonres  
5       envelope?

6                   MR. WARE:   Dave Ware, Owens Corning.   I  
7       just want to make a comment to the modular  
8       classroom suggestion.   We support that issue,  
9       however I mentioned this a few weeks back in San  
10      Ramon, there is a threshold where one can reach as  
11      far as energy efficiency and the actual acoustics  
12      of that space diminishes.

13                   And I would just suggest that the work  
14      that's being done on modular classroom is reviewed  
15      by people like us that have done a lot of work or  
16      other people in the acoustics industry so we  
17      insure that the modular classrooms indeed achieve  
18      their intended result.   That is they are a  
19      classroom teaching facility and we don't lose  
20      sight of that.

21                   Thank you.

22                   MR. PENNINGTON:   Any other suggested  
23      changes in this area?   Hello, Bob.

24                   MR. Burt:   I'm Bob Burt, Insulation  
25      Contractors Association.   The reason I have



1       selected to speak up during your commercial on  
2       nonresidential section is that it seemed that a  
3       lot of momentum in the residential area.

4               I half way support the increased  
5       insulation that's already been recommended, while  
6       deferring to SoCalGas on the safety of water  
7       heater blankets.

8               I do have a comment on one issue that's  
9       been raised, and that is window replacement. A  
10      lot of the stock of our homes that we have in  
11      California, the windows were put in when the  
12      egress requirement called for a higher sill. The  
13      egress requirement is a safety requirement that  
14      requires that if a bedrooms, have it allowed that  
15      people can get out in the event of fire or  
16      earthquake.

17              That egress requirement, as I said, has  
18      been changed so that almost newer houses and newer  
19      specs, you require a lower sill than the ones that  
20      were put in before.

21              If, in fact, you replace windows and  
22      also require the person to move the sill to the  
23      lower egress requirement you suddenly have a much  
24      much more expensive job. And the number of  
25      windows you're going to replace are going to be a

1 lot smaller.

2 So, if you have rules which touch this  
3 area I suggest you be very cautious about  
4 affecting the job of simply pulling a window and  
5 putting a new window in in place of it.

6 We feel that if that is done and the  
7 open space of the window is the same as that which  
8 is replaced, that you're meeting the standard that  
9 was in place when that was built. And that  
10 therefore it is appropriate.

11 And as I said, if you touch that process  
12 then I can assure you that we have a lot fewer  
13 replacement windows go in.

14 The reason I can speak with some  
15 authority on this is that many of our members do  
16 window replacement as part of their job, their  
17 other work that they do.

18 A minor point that I would raise is  
19 among insulation contractors there is very little  
20 enthusiasm on the subject of recessed lights. The  
21 reason for that is if you insulate them very well  
22 you get call-backs because the safety factor in  
23 that light means that it turns off if it gets too  
24 hot.

25 So all I can say is if you call for a

1 change in the recessed light specs, do not require  
2 that they are insulated too darn well, because if  
3 they are you will find that they become a real  
4 bother to the homeowner.

5 Now, turning to the points that I wish  
6 to raise on commercial, the reason that I chose  
7 commercial and nonresidential is the point to  
8 raise my -- is that to call your attention to the  
9 fact that the current commercial rates are  
10 spectacularly higher. They justify considerably  
11 better cost benefit than anything that you have  
12 justified in the past.

13 And I hasten to respond to the point  
14 that well, there are those who say that these  
15 rates are temporary. I have three answers to  
16 that. The first I cite the famous authority,  
17 Voltaire, who said nothing endures like the  
18 temporary.

19 (Laughter.)

20 MR. BURT: Second, I would point out  
21 that the very stately rate at which regulation  
22 occurs I suspect that any revision by the FERC of  
23 the rather tough contracts that California is now  
24 burdened with probably will not be completed by  
25 the time of your deadline for setting rate

1 standards. That next year is very soon.

2 And third, real politic, I have followed  
3 the PUC as a participant for 35 years, and I can  
4 tell you that there are fierce advocates for lower  
5 residential, farm and industrial rates. Very few  
6 people show up to complain about commercial rates.

7 The result is commercial rates go up  
8 like a skyrocket and come down like a feather.

9 So I think you can assume when you're  
10 planning cost/ benefit ratios that there will be a  
11 considerable period when commercial rates are  
12 considerably higher than any rates that were in  
13 effect when you passed your current regulations.

14 With that I would add a small point, a  
15 plan check is not enough. As the one reason that  
16 almost all commercial contracts call for as-built  
17 drawings is that very few buildings are finished  
18 like they were planned.

19 In an area where you might save  
20 considerable money by not finishing it as is  
21 planned, I think there's a great deal of  
22 temptation to do just that.

23 I thank you. If you have any questions,  
24 I'm happy to answer.

25 MR. PENNINGTON: Thanks, Bob. Are there

1 other suggested changes for the nonres envelope?

2 Okay, let's go to HVAC and water

3 heating. Jeff Johnson, are you on the phone?

4 MR. JOHNSON: Yes, I am.

5 MR. PENNINGTON: Okay, you're on.

6 MR. JOHNSON: Okay, thanks. This is  
7 Jeff Johnson of the New Buildings Institute. I  
8 wanted to thank Bob, the previous speaker, for a  
9 nice segue into this topic of performance  
10 verification.

11 It's a project that is being funded  
12 through the California Energy Commission by the  
13 U.S. Department of Energy. And what we're doing  
14 is looking at trying to develop verification  
15 protocols for specific systems and subsystems of  
16 provisions contained in the standard. And then  
17 also develop a mechanism to implement those  
18 provisions.

19 A couple things I want to point out with  
20 this proposal. First of all, these are not new  
21 technologies that are being proposed for the  
22 standard, but essentially getting technologies  
23 that are currently required by the standards to  
24 work as designed and as modeled.

25 Secondly, I think those who are

1       currently doing it right will be minimally  
2       affected by these proposals. And what we're  
3       trying to do is get others to replicate their good  
4       work.

5               Those who are not currently installing  
6       and starting up equipment properly will probably  
7       bear a greater burden in this project.

8               I had a couple slides. I was wondering  
9       if those are up?

10              MR. PENNINGTON: The first one is up.

11              MR. JOHNSON: Okay, is that the boxes?

12              MR. PENNINGTON: It says third-party  
13       performance verification project.

14              MR. JOHNSON: Okay, why don't we go to  
15       the next slide then, if you could, please.

16              MR. PENNINGTON: Okay.

17              MR. JOHNSON: Okay, great. A couple  
18       things about performance verification. One is it  
19       is not building commissioning. Building  
20       commissioning, as defined by PECO and others,  
21       really starts early in the design phase, and  
22       continues through building operation and operator  
23       training and production of the manuals of  
24       operation.

25              Performance verification is something

1 we're trying to do that extends beyond, it sort of  
2 works at the edges of code enforcement and it has  
3 two steps.

4 The first is developing construction  
5 documentations, which would then be approved prior  
6 to permit. And secondly, doing some testing to  
7 verify that certain systems and equipment are  
8 operating properly. And that occurs prior to  
9 certificate of occupancy. So this is really not,  
10 it's not commissioning, it's the subset of  
11 commissioning that we're proposing to include in  
12 the standard.

13 If you go to the next slide, the other  
14 difference between this proposal and some others  
15 done by ASHRAE, City of Seattle, as well as  
16 Massachusetts, is that we are proposing that  
17 specific systems be subject to these test  
18 requirements. And we'll also be developing test  
19 requirements for these systems.

20 The systems listed on the left there  
21 include air distribution which currently has some  
22 verification requirements on small systems.  
23 Lighting controls; economizers; package HVAC  
24 controls. And then also looking at some large  
25 equipment, including VAV, fan and outdoor air

1 control, as well as chilled water systems.

2 And a few issues that we're current  
3 wrestling with on this project. One is the third-  
4 party organization to conduct the certification.  
5 We're going to be working closely with the  
6 California Commissioning Collaborative and others  
7 to help to define this entity and develop those  
8 certifications.

9 I think the second issue is really the  
10 role of the professional engineer in the whole  
11 process. And I think that's a topic of discussion  
12 we'll be having future hearings on to talk some  
13 more about.

14 And the third issue is really use of the  
15 building automation system in both monitoring and  
16 testing, particularly on large equipment. And  
17 whether that's something that's required, or  
18 something that's an option.

19 So that's the proposal for performance  
20 verification.

21 MR. PENNINGTON: Okay, thanks, Jeff. If  
22 you could stay on the line we may have some  
23 questions at the other section.

24 MR. JOHNSON: Very good.

25 MR. PENNINGTON: So that might be, it's



1       about 10 or 15 minutes from now.

2               MR. JOHNSON:   Very good, I'll do that.

3               MR. PENNINGTON:   Mark.

4               MR. HYDEMAN:   I'd like to say we've kind  
5       of stripped ourselves of any fire here, because a  
6       lot of the measures got moved over -- oh, sorry.  
7       Mark Hydeman, I'm with Taylor Engineering, and I'm  
8       part of the team with Charles Eley on the  
9       nonresidential HVAC and other Title 24  
10      requirements for 2005.   In fact, Taylor  
11      Engineering is the lead on the nonresidential HVAC  
12      portion.

13              But anyway, we've stole our own fire.  
14      Some of the measures that we're working on are, in  
15      fact, going to be presented under the case  
16      initiatives which follow.

17              However, we do have a few measures that  
18      we're considering as part of the group's effort  
19      for upgrading Title 24.

20              The first one is potentially looking at  
21      ASHRAE standard 62.   In particular, we're very  
22      interested in 62N, which is a proposed addenda  
23      which right now is going through review.   And if  
24      62N is adopted it appears as if we would have the  
25      basis for lowering some of the ventilation

1 requirements in high density occupancies.

2 62N is basically very similar when you  
3 look at the present Title 24 office occupancies.  
4 But some of the higher densities, some of those  
5 ventilation rates drop. And so there's a  
6 possibility of incorporating 62 by reference and  
7 getting rid of some of the tables that are  
8 presently in section 121 of Title 24.

9 And 62N, unlike the rest of 62 1999  
10 standard, 62N is actually written in code  
11 language. And the subsequent addenda to the '99  
12 standard were all written in code language. So  
13 it's much easier to adopt.

14 The second issue is air side economizer  
15 requirement. We're interested in looking at it  
16 based on climates, the 16 California climates, and  
17 look at the break points at which the economizers  
18 are cost effective.

19 We did this exercise under the AB-970  
20 standard, just mapping the ASHRAE 90.1 table  
21 across to the California climates, and we found  
22 that the size of the units for which economizers  
23 were required dropped in the milder climates, like  
24 climate zone 3 and climate zone 4. But when you  
25 get to a climate zone like the one that Barstow is

1       in, of course the size of the unit and the cost  
2       effectiveness of the economizer increase.

3               There's also some interest in looking at  
4       some of the exemptions from section 112, the  
5       equipment efficiency requirements for equipment  
6       that presently do not have test standards.

7               These would be things like evaporative  
8       condensers; the adsorption chillers; there's a few  
9       other classes of equipment for which there's no  
10      industry test standard. There's no requirement  
11      presently explicitly stated in Title 24, and --  
12      like exists in ASHRAE standard 90.1 in both the  
13      '99 and 2001 versions. We'd like to have an  
14      exception for equipment for which there is no  
15      present test standard.

16              And most of that -- at least the  
17      equipment that I mentioned earlier is mostly being  
18      applied, in some cases to using heat recovery for  
19      cooling; in the case of evaporative condensers, of  
20      course, they are arguably more efficient than  
21      their air-cooled companions.

22              But the idea is as test standards are  
23      developed, as ARI develops the test standard for  
24      evaporative condensers, then we'd consider adding  
25      them to the tables.

1                   Next one is modifications to load  
2                   calculation requirements which are presently  
3                   section 144B of Title 24. These are the  
4                   prescriptive requirements for load calculations  
5                   and oversizing.

6                   We'd certainly like to have exceptions  
7                   for equipment where oversizing, in fact, is an  
8                   energy benefit. It would be things like cooling  
9                   towers. An oversized cooling tower arguably is  
10                  actually good for energy use and potentially  
11                  demand. Same thing with oversizing of duct work  
12                  or pipes.

13                  However there's some equipment where  
14                  oversizing can be an extreme penalty, and not only  
15                  in energy use but also in comfort.

16                  And the other side of it is on the load  
17                  side of the requirement, which is section 144B,  
18                  presently it's very prescriptive about how you do  
19                  your load calcs, and in particular there's this  
20                  requirement for using very specific weather data  
21                  for the purpose of load calcs.

22                  And that basically puts the engineer in  
23                  a very awkward position of having to do two sets  
24                  of calcs. One for what they believe their real  
25                  design condition is, dealing with micro-climates,

1       if, in fact, they're concerned about the heat of  
2       the air above a roof being above, as Henry Lau and  
3       others have found, that the temperatures above the  
4       roofs are much warmer than the ambient air  
5       temperature.

6               To take that into account you would  
7       essentially have to run two sets of load calcs.  
8       One for sizing your equipment, and the second for  
9       compliance. And so we'd like to follow the ASHRAE  
10      standard 90.1 lead on that, and certainly require  
11      the load calcs are done and available for the  
12      building department to review. But not be as  
13      prescriptive about the elements of those load  
14      calcs.

15             MR. PENNINGTON: We're past time now,  
16      Mark, so --

17             MR. HYDEMAN: What's that?

18             MR. PENNINGTON: We're past time, so --

19             MR. HYDEMAN: Okay, two more --  
20      efficiency requirements for motors not presently  
21      covered by EPACT. And again there's a -- all of  
22      these we have a screening paper on, but there's  
23      some motors presently that are outside of the  
24      EPACT requirement. We're looking at those.

25             And then we're looking at various

1 elements from the 90.1 standard, including the  
2 requirement for variable flow hydronic systems,  
3 which is ASHRAE standard 90.1 6.3.4.

4 Before I turn it over to Mark Modera I'd  
5 like to say that there are a couple others we're  
6 still considering. One of them is the operable  
7 window issue that was mentioned by Gary Farber  
8 earlier. But it's a very difficult thing to  
9 interlock operable windows with HVAC systems, and  
10 can be quite expensive. And we're grappling with  
11 that.

12 VAV box minimums. VAV air system  
13 pressure locations and reset controls. And  
14 possibly modifying the ACM rules to better assess  
15 the impact of under floor distribution systems.

16 I'd like to turn the floor over to Mark  
17 Modera who will talk about duct ceiling.

18 MR. MODERA: Hello, I'm Mark Modera.

19 I'm --

20 MR. PENNINGTON: You've got one minute.

21 MR. MODERA: I can do it, okay --  
22 representing LBNL. And basically there were two  
23 items on the list and one was to move over the  
24 ASHRAE standard 90.1 requirements for duct testing  
25 in large commercial buildings. And right now

1 inspect it. You have to test above three inches.

2 And one thing we might look at is  
3 whether or not we would want to drop the three  
4 inches a little bit lower based upon our filters -  
5 - there's a lot of leakage on the downstream side.  
6 And it can have just as big of an impact on the  
7 energy use.

8 And then the second item is to -- we're  
9 looking at introducing the concept of overall  
10 thermal distribution efficiency. The point being  
11 that you should be able to compare hydronic system  
12 with an air system or with any other sort of like  
13 distributed HVAC system.

14 The point being that right now you  
15 compare air with air and water with water. And if  
16 there's a way that we could go about introducing  
17 that into the standard we're going to see if we  
18 can do that. I'm not sure yet, but that's what we  
19 have in mind.

20 And that was less than a minute.

21 MR. PENNINGTON: Okay, thank you. PG&E.

22 MR. BLANC: Steve Blanc from PG&E. The  
23 areas that we're looking at in our program on HVAC  
24 and water heating are starting with cooling  
25 towers. One of the issues that we're looking at

1 is really trying to improve the efficiency and  
2 operation of cooling towers.

3 We're looking at tightening the  
4 regulation around cooling tower efficiency using  
5 at first a 9 or a 10 degree approach temperature.  
6 Sort of a static issue. And then coupling that  
7 with the sizing of towers looking at different  
8 approach temperatures.

9 Basically saying that oversizing towers  
10 is okay, and that we would like to see more  
11 efficient towers installed.

12 The second part of this is applications  
13 having to do with centrifugal fans. Trying to  
14 limit those applications to where either the size  
15 of the tower or pressure differentials inside the  
16 tower requires centrifugal fan.

17 Our studies indicate you use about twice  
18 as much energy with centrifugal fans as you do  
19 with propeller fans. And we'd like to see that  
20 changed.

21 The third point is set points on the  
22 tower fans, themselves. In fact, Mr. Hydeman and  
23 I are involved in an audit program right now where  
24 we're looking at auditing chiller plants in major  
25 customer facilities.



1                   And one of the things that we're  
2           consistently recommending is being able to operate  
3           tower fans and towers at different set points and  
4           different temperatures to coincide more with the  
5           loads.

6                   Along with this is the control of  
7           multiple tower fans and the staging. Again, the  
8           issue is how much bang you get for your buck in  
9           terms of operating more fans to save chiller  
10          energy or operating fewer fans to save fan energy.

11                  One controversial part of this is going  
12          to be that we're looking at further restrictions  
13          on air cooled chillers because the water cooled  
14          side are usually more efficient.

15                  Next slide. Demand control ventilation.  
16          First of all we want to expand the current  
17          regulations to more occupancies. These are  
18          occupancies that are intermittent in their use.  
19          We think the improvement in controls over the last  
20          few years indicates that we can probably get more  
21          savings out of places like airport terminals,  
22          classrooms and the like.

23                  We also want to extend this to zone-  
24          based DDC systems to really reset the minimums at  
25          VAV boxes so that we're using newer technology

1       such as CO2 sensors and better thermostats to do  
2       this.

3               This is one area, by the way, I'm  
4       working with our internal building and land  
5       service on specifications for PG&E facilities.  
6       And we are moving in this direction where we're  
7       trying to incorporate as much high tech control as  
8       we can in our own buildings.

9               Improving the control specifications,  
10       basically refining the outdoor air quantities  
11       versus occupant load; making them more responsive  
12       to changes in the latter with the former.

13              The final part of it is ducts in light  
14       commercial. I think that Mr. Modera talked on  
15       this somewhat. We see duct leakage as being worse  
16       than in residential; duct tightening needing to be  
17       part of the baseline building.

18              And that there are two options to get  
19       the credit. One would be requiring a third-party  
20       verification of duct tightness. Or the other  
21       would be extra insulation, or a thermal feature as  
22       not required, that is not presently required.

23              MR. PENNINGTON: Okay, thank you very  
24       much. Okay, Mr. Hogan.

25              MR. BLANC: Oh, is there one more?

1       Excuse me, one more minute to do this.

2               HVAC equipment efficiencies nonres,  
3       bringing non NAECA equipment under Title 24;  
4       updating the costs and efficiencies to reflect  
5       currently available equipment. I think that's  
6       critical because there have been some areas where  
7       the equipment has been improved.

8               And then updating the minimum efficiency  
9       requirements; redefining the standards that really  
10      are not covered now, just kind of bringing  
11      everything up to date with the changes in  
12      technology.

13              And I think that's it now.

14              MR. PENNINGTON: Thank you.

15              MR. HOGAN: John Hogan, City of Seattle.  
16      The items I'm going to discuss are listed on the  
17      agenda and in my comments that were submitted.

18              Staff indicated that they were going to  
19      look at national standards such as standard 90.1  
20      and review items there for incorporation. I'd  
21      like to highlight a few of those and make sure  
22      that they're on the list.

23              The first one is automatic time switch  
24      control devices, and to require seven-day  
25      programming capability instead of just weekday/

1 weekend capability. This is in section 119C,  
2 which ostensibly refers to lighting control  
3 devices. But section 122 for HVAC controls refers  
4 back to this, so it affects both of them.

5 Obviously nonresidential spaces have  
6 lots of different schedules. That weekday/  
7 weekend is not adequate. We have office buildings  
8 which are open, you know, during the week; but  
9 then part of the day Saturday, but closed on  
10 Sunday.

11 Restaurants and bars are open late on  
12 Friday and Saturday, maybe closed on Monday.  
13 Retail spaces open late one night during the week,  
14 closed a little earlier Saturday, open later on  
15 Sunday. So there's a whole range of places where  
16 just two schedules is not adequate for that.

17 Second topic, section 122F talks about  
18 dampers. Should also move to update to ASHRAE  
19 90.1 to require motorized dampers, as indicated in  
20 section 6 of ASHRAE 90.1. And also to establish  
21 damper leakage limits.

22 This is an addendum to 90.1 to the 1999  
23 version. There were 34 addenda that were approved  
24 by the 90.1 Committee and the ASHRAE Board of  
25 Directors, and they will be in the 2001 version.

1       So when CEC is going through the material you  
2       should definitely be looking at those addenda, not  
3       just looking at the '99 version.

4               Jeff Johnson brought up the issue of  
5       performance verification, also known by others as  
6       completion and commissioning. But regardless of  
7       what you call it, we need some sort of mechanism  
8       to make sure that the expected energy savings are  
9       being realized. Both the Seattle and Washington  
10      State Energy Codes have requirements for that,  
11      predominately taken from ASHRAE standard 90.1.

12             Wanted to talk about two other items  
13      which where Seattle has requirements which go  
14      beyond 90.1. One is to address the power  
15      consumption of small fans. And we recommend that  
16      you require electronically commutated motors for  
17      fan motors less than 1 horsepower that are  
18      installed in series and terminal units.

19             Very common HVAC system is variable air  
20      volume system with fan power terminal units. Most  
21      of those fans are small fans, less than 1  
22      horsepower. They run continuously; people like  
23      the air movement.

24             Once you have a built up system and  
25      you've got the variable frequency drive for the

1 main fan, it turns out that fully half the energy  
2 consumption is in the small fans. And when you go  
3 to this newer technology, the electronically  
4 commutated motors, their efficiency is .15 to .2  
5 watts/cfm compared to .4 with the standard motors.  
6 So there's a lot of potential there.

7 And then the last item I wanted to  
8 mention was economizers. Mark Hydeman touched on  
9 this in his presentation. Obviously California's  
10 got some pretty mild climates. It should make  
11 maximum use of economizer.

12 The Seattle Energy Code requires that  
13 single package unitary fan cooled units that are  
14 installed outdoors in a mechanical room adjacent  
15 to outdoors have economizer if the cooling  
16 capacity is greater than 20,000 Btuh.

17 So essentially anything two tons or  
18 larger that's got access to outside air needs to  
19 have economizer.

20 I have heard some people talk about the  
21 dependability of economizers. If there is a  
22 concern my recommendation is that the CEC develop  
23 standards or requirements so that these  
24 economizers are performing as they should.

25 Thank you.

1                   MR. PENNINGTON:   Okay, thank you.   Dave  
2   Ware.

3                   MR. WARE:   Dave Ware, Owens Corning,  
4   Manager of Codes and Regulation.

5                   I've already discussed this in the  
6   residential portion of the standards, but I think  
7   it's also conducive to the nonresidential portion  
8   that we bring the duct insulation requirements  
9   within the energy efficiency standards so that we  
10   can adjust those standards.

11                  We've already heard from some of the  
12   other speakers about duct leakage and things of  
13   that sort.   And it's important that the conductive  
14   elements of ducts are also adequately addressed.

15                  Thank you.

16                  MR. PENNINGTON:   Thank you.   Gary.

17                  MR. FARBER:   Gary Farber.   Get back to  
18   heat pump sizing which I brought up erroneously  
19   earlier, I guess.

20                  The current standards calls for the heat  
21   pump to be at least 75 percent of the load, and  
22   obviously the smaller the heat pump is in  
23   relationship to the load the more it's going to be  
24   on electric resistance heating.   So let's get it  
25   up to at least 100 percent of the load.

1           Electric water heaters. There's a big  
2           waste in nonresidential buildings. Electric  
3           storage water heaters. They're not really, in  
4           terms of the code, the energy efficiency code  
5           they're not really regulated. Only in terms of  
6           the appliance standards.

7           Sort of like to see, if you're proposing  
8           electric storage water heaters, that it be  
9           compared to a gas water heater as a reference  
10          system and performance and that you can't do it  
11          under prescriptive compliance approach.

12          Radiant slabs. Sometimes I see radiant  
13          slabs in nonresidential like childcare centers.  
14          There's nothing in the code about how you deal  
15          with heated slab-on-grade. So it should have the  
16          same requirements as residential heated slabs.

17          Let's see, ventilation. I've seen some  
18          low rise and high rise residential where they're  
19          just exhausting all the corridor air because it's  
20          cheaper than ducting the return air. So that's a  
21          huge energy waste. I think we ought to have  
22          either limits on the maximum ventilation rate,  
23          and/or if the ventilation rate exceeds a certain  
24          amount, you have to do the heat recovery, as I  
25          mentioned earlier this morning.



1                   Okay, performance compliance and  
2           reference mechanical system. Right now the  
3           reference mechanical system to develop the  
4           standard budget depends on the number of stories  
5           of the building. And I think that's fairly  
6           artificial determinate. Kind of similar issue to  
7           the multifamily res, whether it's type of --  
8           number of stories isn't nearly as important as the  
9           type of system.

10                   In nonres I'd like to see the reference  
11           system change from single zone to VAV based on the  
12           size of the building, not the number of stories.  
13           I've seen two- and three-story buildings that are  
14           huge and four- or five-story buildings that are  
15           relatively small. So, it's pretty artificial and  
16           should be addressed.

17                   Exhaust fans. Perhaps we ought to have  
18           mandatory automatic controls on exhaust fans so  
19           that they don't stay on, either occupancy type or  
20           odor or something.

21                   And then recirculation on domestic hot  
22           water. We talked about that in relation to the  
23           low rise standards. It's the same issue on high  
24           rise residential, as well.

25                   Thank you.

1                   MR. PENNINGTON: Did you have a comment  
2                   on commissioning?

3                   MR. FARBER: Oh, okay. Well, it's been  
4                   brought up. I'd certainly support some type of  
5                   credit, something to encourage that.

6                   MR. STONE: Bill, can I ask a question?

7                   MR. PENNINGTON: Sure.

8                   MR. STONE: Gary, I want to make sure I  
9                   understood you correctly. Were you saying that on  
10                  high rise residential shouldn't be allowed to dump  
11                  all the air from corridors, but either have an HRV  
12                  or something else? And were you just talking  
13                  about corridors?

14                  MR. FARBER: I'm talking about heated  
15                  corridors.

16                  MR. STONE: I'm sorry?

17                  MR. FARBER: I'm talking about heated  
18                  corridors, you know.

19                  MR. STONE: Okay, so what I was trying  
20                  to get at is you were talking specifically just  
21                  about the corridors in high rise residential?

22                  MR. FARBER: Right. Well, I don't see  
23                  the units being 100 percent exhausted, but  
24                  sometimes the corridors are 100 percent exhausted.

25                  MR. PENNINGTON: Okay. Steve, you're

1 up.

2 MR. GATES: When we wrote the letter we  
3 were just throwing in things here to, you know,  
4 think of as many things as we could. And I didn't  
5 really think I'd be talking about it here today.  
6 I'll try to rip through these quickly.

7 First has to do with HVAC controls, and  
8 in particular the widespread use of direct digital  
9 controls now, coupled with variable speed drives  
10 that are quite reliable, as well as relatively  
11 inexpensive.

12 Because of the evolution that's happened  
13 over the last decade, it really makes sense that  
14 the Commission look at improved control sequences,  
15 particularly improved control sequences using  
16 variable speed drives. And I am aware that there  
17 are other projects going on with the PIER projects  
18 and what-all, that are also addressing these. So  
19 I don't think it makes too much sense to go into  
20 these in detail.

21 Next slide, please. First one has to do  
22 with variable speed drives on fans. All of the  
23 DOE2 runs we've done in the last few years have  
24 always shown variable speed drives to be cost  
25 effective compared to inlet vanes or similar means

1 of capacity control.

2 So it really makes sense, I think, at  
3 this point to consider requiring variable speed  
4 drives on all VAV fans regardless of size. Right  
5 now the standards address capacity control of  
6 horsepower above 25 horsepower, so variable speed  
7 drives in the 5 of 10 horsepower range are also  
8 quite cost effective.

9 So I would strongly recommend that you  
10 take a fresh look at the whole issue of capacity  
11 control.

12 Next slide, please. This is related to  
13 VAV systems, and has to do with what is probably  
14 the most common HVAC system in the State of  
15 California, which is a package, rooftop, single  
16 zone system in the 10 ton range.

17 These units typically have two  
18 compressors; they have two stages of cooling. The  
19 gas packs are typically two stages of heating.  
20 They have a fan that runs at full output whenever  
21 the fan is on.

22 We've got a project going right now with  
23 Southern California Edison to look at this, the  
24 idea being that when you are not at high level  
25 cooling, or, you know, maximum output cooling or

1 heating, that you go ahead and put a variable  
2 speed drive on these, and knock down the fan  
3 horsepower.

4 Preliminary indications are that these  
5 fans typically use as much energy on an annual  
6 basis as the cooling compressors. It's very easy  
7 to knock 50 percent or more off of that  
8 consumption. It's probably the single most  
9 effective thing that you could do in terms of  
10 improving the overall energy performance of these  
11 units. Far more effective than trying to raise  
12 cooling efficiencies.

13 Next slide, please. Now, this is one  
14 that has kind of bothered me for a couple decades  
15 now. I am one of the authors of DOE2. I've done  
16 a huge number of DOE2 simulations over the years.

17 Typically I find if I neglect the piping  
18 losses in a VAV reheat system, the program will  
19 underestimate gas consumption by a factor of two  
20 to three.

21 So my conclusion on that is that the  
22 distribution losses of VAV reheat systems are  
23 typically at least as great as the actual end use  
24 energy consumption.

25 So, given that, it might make sense to

1       reconsider the restrictions in terms of electric  
2       reheating these systems. It doesn't necessarily  
3       follow that electric reheat is actually less  
4       energy efficient on an annual basis.

5               But this is also related to other  
6       control sequences that one might implement with  
7       VAV hot water reheat systems, which is what the  
8       next slide's about.

9               Okay, in VAV systems right now before  
10      doing reheat you require that supplier  
11      temperatures be reset. The standards, themselves,  
12      do not address the issue of resetting hot water  
13      temperatures for these reheat systems.

14              Middle of winter, you might need a  
15      temperature of 140 to 180 degrees in these reheat  
16      coils to provide the warm-up necessary in the  
17      mornings. The middle of the summer when all  
18      you're really trying to do is temper air that's  
19      being delivered at 55, and maybe tempering it up  
20      to 60 or 65, you certainly don't need 180 degree  
21      water.

22              But currently there is no requirement in  
23      the standards that water temperatures be reduced.  
24      And clearly the distribution losses would be  
25      substantially less if the water temperature was

1       reset intelligently.

2                   Next slide, please. This is an  
3       interesting one. I used to be a controls  
4       representative for the Barber-Coleman Company.  
5       And what I discovered with the direct digital  
6       control VAV boxes that they have, as well as other  
7       manufacturers, is you could put the minimum cfm  
8       ratio down as low as you want on these boxes, but  
9       as soon as they go into reheat they really kick up  
10      to 50 percent. And you have no choice about  
11      whether it does that or not.

12                  The reason it does it is because if you  
13      actually try reheating with 30 percent flow it's  
14      very common that you'll get stratification  
15      problems in the space. You get a lot of hot air  
16      floating on the ceiling. Down where the people  
17      are, it stays cold.

18                  You need to put the air into little bit  
19      more velocity to actually avoid the stratification  
20      issues.

21                  Now, the standards require this. I'd be  
22      willing to bet that probably two-thirds to three-  
23      quarters of all the buildings installed don't  
24      comply with this. Because the controls  
25      manufacturers, themselves, know better.

1                   So it might made sense to revisit this  
2                   and figure, okay, what is reasonable to require  
3                   it. I think it is reasonable that before doing  
4                   reheat that you definitely knock the air flows  
5                   down.

6                   Once you're in the reheat mode, I  
7                   strongly disagree with the standards in terms of  
8                   whether they actually make sense.

9                   Next slide, please. Condenser relief.  
10                  This is something that's already been touched on  
11                  today. I would like to just make one further  
12                  comment on that.

13                  And that is a lot of the control  
14                  strategies I see having to do with condenser  
15                  relief, ignore the fact that if the wet bulb is 70  
16                  degrees it doesn't matter how hard or how big that  
17                  cooling tower is, you're not going to get a  
18                  condense water temperature less than 70. You  
19                  can't push beyond the wet bowl; in fact, you can't  
20                  get to the wet bowl.

21                  And actually I tend to disagree with  
22                  some of the concepts about oversizing towers. The  
23                  reality is the vast majority of hours the cooling  
24                  tower is already oversized.

25                  And the harder you run it you might get



1 another degree or two in condenser temperature,  
2 but the horsepower you use to get that does not  
3 translate into an equivalent chiller savings.

4 You really need to look at the system.  
5 And I do understand that there are projects going  
6 on to evaluate that. The most recent version of  
7 DOE2 has a lot of cooling tower control strategies  
8 built into it which are not commonly used, and  
9 could be applicable for these projects.

10 Next slide, please. Again getting back  
11 to variable speed drives. I was reviewing chiller  
12 data for centrifugals just in the last few weeks  
13 and was quite surprised to see that coupled with  
14 condenser relieve a chiller with a variable speed  
15 drive can actually have an efficiency or a power  
16 consumption ratio, if you want to call it that, as  
17 low as .25 kW/ton at 40 to 50 percent load.

18 That's half of what it uses at full  
19 load, which is, you know, just a tremendous source  
20 of savings. So, it strongly suggests that the  
21 Commission take a look at centrifugal chillers and  
22 whether variable speed drives should be, you know,  
23 when they should be mandated.

24 It also tends to argue against being too  
25 frugal on the sizing criteria. Centrifugals with

1       variable speed drives, if they're oversized,  
2       actually wind up being more efficient on an annual  
3       basis than if you sized them exactly properly.  
4       So, you've got to be a little careful here with  
5       some of the sizing criteria.

6               Next slide, please. Pumps again are  
7       another very obvious application for variable  
8       speed drives, particularly chilled water systems.  
9       Hot water systems, if they run a significant  
10      number of hours, again they're excellent  
11      candidates. And I really do think the standards  
12      should address pumps in more detail.

13             Next slide, please. Okay, now I'm  
14      getting ahead of the slide people here. Okay,  
15      I've never seen or heard of any conversations  
16      regarding domestic water booster pump systems.

17             Basically any building that is four  
18      stories tall, and actually quite -- most buildings  
19      that are three stories tall need booster pumps so  
20      that you have sufficient water pressure on the  
21      upper floors to operate the fixtures.

22             Two identical buildings designed by two  
23      different engineers, one may use twice the energy  
24      for pumping that water than the other one does.  
25      This would be obviously a whole new area that the

1 Commission hasn't looked at, I presume. But I  
2 would at least like to flag this as an area that  
3 should be investigated.

4 Next slide, please. Okay, now this is  
5 also an area that the Commission has never  
6 addressed before. And would actually represent a  
7 rather large step in terms of what it is you're  
8 attempting to regulate in the State of California.

9 Commercial industrial refrigeration  
10 systems currently are not addressed by the  
11 standards, but actually in the state use quite a  
12 bit of energy. For example, supermarkets, it's my  
13 understanding that supermarkets in PG&E's  
14 territory use as much energy as all of the HVAC  
15 systems in all of the commercial office buildings.

16 Currently they're totally unregulated.  
17 The refrigeration systems within those  
18 supermarkets typically consume, oh, 30 to 50  
19 percent of the total that a supermarket uses. If  
20 anyone wants to get an idea of how much energy  
21 they use, just go ahead and leave your  
22 refrigerator door and your freezer door open for a  
23 month or two and see what happens to your electric  
24 bill.

25 It's a huge potential savings. Not just

1       in the fixtures within the store, itself, but in  
2       terms of the racks of compressors in the back room  
3       as well as the condensers that finish out the  
4       systems.

5               Now the interesting thing about  
6       supermarkets or other industrial facilities like  
7       this is these are highly engineered facilities.  
8       There's not a lot of package equipment that goes  
9       into them. The engineers that lay out these  
10      systems are typically at least as sophisticated as  
11      HVAC engineers.

12             There's a huge potential here for  
13      savings, but they're not being realized. And one  
14      of the primary reasons is that there has never  
15      been an analysis tool. The industry is very  
16      similar to the state of the HVAC industry back in  
17      the mid '70s when the first oil shocks hit. And  
18      people didn't understand why when they did certain  
19      things to buildings energy sometimes went up  
20      instead of down.

21             And, in fact, that was one of the  
22      original reasons the DOE2 program -- well, that  
23      was the original reason why the DOE2 program was  
24      written, was to give engineers a tool so that they  
25      could start looking at the impact of their energy

1 decisions.

2           The DOE2 program, now there's a  
3 developmental version of that program that was  
4 jointly funded by Southern California Edison and  
5 PG&E, which has a whole new component based  
6 refrigeration module that allows one to actually  
7 build up a supermarket system out of its  
8 individual components, such as display fixtures in  
9 the store, suction lines, liquid lines, racks of  
10 compressors with individual compressor specified  
11 within each rack, subcoolers, condensers, all  
12 kinds of different control strategies.

13           This version of DOE2 is currently being  
14 used by the publicly owned utilities -- or I  
15 should say the privately owned, the investor owned  
16 utilities within the State of California in their  
17 refrigeration savings by design programs.

18           What we're typically finding at this  
19 point is that savings on the refrigeration systems  
20 can be on the order of 30 to 50 percent compared  
21 to what we're assuming is current design, you  
22 know, conventional design.

23           The interesting thing about achieving  
24 these savings is that all of this is achieved  
25 using off-the-shelf components. There are no

1       necessary new technologies that are needed to  
2       significantly improve the energy efficiency of  
3       refrigeration systems.

4               So, basically the challenge, or the  
5       proposal that I'm making to the Commission is that  
6       you take a serious look at this area of energy end  
7       uses within the State of California, and consider  
8       whether this should be an area that is worthy of  
9       being regulated.

10              MR. PENNINGTON: Thank you. All right,  
11       are there any other suggested changes related to  
12       nonresidential HVAC? Yes, sir.

13              MR. WELGUISZ: Rick Welguisz with Trane  
14       Unitary Products Group Division. I would like to  
15       caution the Commission that we don't go into  
16       mandating variable speed motors on all light  
17       commercial or VAV. I suggest that you definitely  
18       look at it, may give it credits, but proceed with  
19       caution.

20              I've been involved in a number of jobs  
21       in my 30-year career with the cfm/square foot on  
22       high volume diffusers in commercial building goes  
23       below good air distribution, and now results in  
24       terminal complaints as we move in -- or tenant  
25       complaints as we move with VAV. So that becomes a

1 diffuser issue which is the weak point.

2 Also I caution you against moving too  
3 fast because a lot of package AC systems, be they  
4 split or packages, you need to allow five to seven  
5 years for manufacturing design changes in  
6 incorporating the VAV drives, because they  
7 currently may not have space in that particular  
8 package or box.

9 And I do suggest that you take a look at  
10 ASHRAE standard 90, 90.1 in particular, since that  
11 would allow all manufacturers to compete on an  
12 equal footing.

13 That's all I have.

14 MR. PENNINGTON: Thank you. Yes, Mike.

15 MR. GABEL: Mike Gabel, Gabel  
16 Associates. This is a real quick reality versus  
17 modeling comment.

18 Over the years I've heard many many  
19 times people, mechanical designers and  
20 contractors, say that package factory installed  
21 economizers don't give you 100 percent outside  
22 air. They're frequently operating more than 50 or  
23 60 percent range typically. It's just one of  
24 those issues where the Commission maybe ought to  
25 look at just the typical operation of small

1 package economizers and the modeling that's being  
2 used to represent them in the standards.

3 Thanks.

4 MR. PENNINGTON: Any other suggested  
5 changes related to nonres HVAC? I did cut off Mr.  
6 Hydeman and Mr. Modera. And it looks like we  
7 actually have fewer public comments, so if you  
8 want to add a comment or two, that would be fine.

9 MR. HYDEMAN: There was one issue I did  
10 want to bring up, it was brought to me by one of  
11 the manufacturers of chillers. And I think it's  
12 an important one to consider.

13 That is if you have a chiller, as he was  
14 suggesting, with a variable speed drive on it,  
15 you're taking a penalty at the full load point,  
16 even though the whole reason that you're putting  
17 the variable speed drive on is to save energy  
18 overall.

19 And we might consider, I think something  
20 we should do offline and discuss, but might  
21 consider allowing chillers that have variable  
22 speed drives to meet the full load rating point as  
23 if they did not have the drive there. In other  
24 words, they didn't have that 2 to 3 percent  
25 penalty. And they can certainly nail the part-



1 load efficiency point.

2 But we're presently penalizing chillers  
3 of variable speed drives at full load.

4 MR. MODERA: The only thing I was going  
5 to say is that in my one minute before what I  
6 didn't describe was the idea that a lot of these  
7 conversations that we're having now about the fans  
8 on the VAV boxes, and the interactions with fan  
9 power, one of the things that's kind of  
10 interesting is that if you look at insulation and  
11 duct leakage, in a way having the VAV -- having a  
12 fan on the VAV boxes, it captures some of those  
13 losses and actually makes the impacts a little bit  
14 less.

15 The only reason I'm bringing this up is  
16 that when we're doing the analysis is this is yet  
17 another reason to try to capture the whole system  
18 and the interactions in terms of figuring out what  
19 the overall impact is. And that's what we're  
20 going after.

21 MR. PENNINGTON: Okay.

22 MR. HYDEMAN: Bill, if I could --

23 MR. PENNINGTON: Sure.

24 MR. HYDEMAN: One other thing I forgot.

25 In Mr. Blanc's presentation he did not mention

1 under cooling towers a new thing that we're  
2 looking at is requiring flow turndowns in towers.  
3 That you can run more cells of a tower if you  
4 have, for instance, a two-cell tower and two  
5 chillers and two condenser water pumps, if you  
6 require a three-to-one turndown ratio on flow,  
7 which is easily achievable with most towers, you  
8 can run a single chiller and single pump across  
9 both cells and get a fair amount of efficiency  
10 increase.

11 So, that's one other item. Thank you.

12 MR. PENNINGTON: Okay. Were there any  
13 other questions for Jeff Johnson while he's on the  
14 phone? Do you have any other comments, Jeff?  
15 He's not on the phone anymore. Oh, well.

16 (Laughter.)

17 MR. PENNINGTON: Trying to impress you  
18 with the technology here.

19 Okay, very good, thank you. We'll move  
20 to nonresidential lighting. Charles.

21 MR. ELEY: All right, again I'm speaking  
22 on behalf of James Binya, who is our subcontractor  
23 on this, and was unable to make it today.

24 There's several topics. The first one's  
25 rather minor, but it would be a modification of

1 the definition of daylighting area to key it to  
2 the height of the window as opposed to the height  
3 of the ceiling.

4 The second proposed change is to abandon  
5 the tandem wiring requirement for three lamp  
6 ballast. It's been there for a long time, and  
7 simply require electronic ballasts instead. Right  
8 now electronic ballasts are an exception to this  
9 requirement. And we think it's time, and the  
10 industry's come around to the point where we ought  
11 to just require electronic ballasts and modify  
12 that requirement.

13 The third bullet is to make the bilevel  
14 or variable level switching requirement apply more  
15 widely, in particular to spaces that have low  
16 lighting power density. Right now there's an  
17 exception for spaces below a watt a square foot,  
18 and this change would move that to .6 watts per  
19 square foot. So it would eliminate one of the big  
20 exceptions to the bilevel illumination  
21 requirement.

22 Most of us believe that this is a very  
23 important requirement for managing peak load in  
24 California. It enables peak load to reduce power  
25 by 50 percent and still be completely functional.

1                   The third -- excuse me, the fourth  
2                   requirement is kind of a simplification. And this  
3                   would be to develop one or more prescriptive  
4                   methods for achieving compliance with the lighting  
5                   power density requirements.

6                   The way this would work is you would  
7                   have a maximum spacing on luminaires, maximum  
8                   wattage on luminaires. And as long as you met  
9                   those requirements you would be deemed to comply  
10                  with the lighting power density requirements.

11                  This has been successful in other areas,  
12                  I think in Washington and Seattle have a similar  
13                  requirement to this. And I think it's time that  
14                  we consider it here. It would simply the  
15                  compliance process quite a lot. And I think  
16                  achieve some good savings.

17                  There's not a lot of detail provided on  
18                  the next one, but those of you who have gone  
19                  through the tailored lighting requirements for  
20                  retail stores know that they're not very simple.  
21                  They've very difficult to understand. And we've  
22                  got some ideas, without going into the details  
23                  here, about how to simplify that process and make  
24                  it more workable.

25                  The next code change would require

1       automatic lighting controls, time scheduled  
2       shutoff for all buildings. It would eliminate the  
3       5000 square foot exception that now applies. And  
4       for all nonresidential buildings you'd have to  
5       have time clock control, or some type of automatic  
6       shutdown.

7               MR. PENNINGTON: Please come up to the  
8       microphone to ask the question.

9               MR. GABEL: If I'm not mistaken, I  
10      believe that that came out in 2001.

11              MR. ELEY: That's already in it?

12              MR. GABEL: Yeah.

13              UNIDENTIFIED SPEAKER: That's correct.

14              MR. ELEY: Okay. Done. Check that one  
15      off.

16              (Laughter.)

17              MR. ELEY: All right. Right now, for  
18      outdoor lighting control now there's a choice  
19      between the time clock and a photocell. And this  
20      would require a combination control that takes  
21      advantage of both technologies.

22              And then the final bullet on this list,  
23      maybe one of the more important ones, there's now  
24      a new series of T8 electronic lamp ballasts called  
25      super T8, various names. That are 15 to 20

1       percent more efficient than the standard -- more  
2       efficacious than the standard T8 lamp.

3               It represents a leap in lamp efficacy on  
4       the order of what we had when we went from T12 to  
5       T8, to standard T8s. And we think in light of  
6       this that we ought to take a look at the lighting  
7       power density requirements across the board in  
8       both the tailored, the whole area method, and the  
9       whole building method.

10              Thank you.

11              MR. PENNINGTON: Okay, thank you. PG&E.

12              MR. BLANC: Steve Blanc, PG&E. I wanted  
13       to reemphasize the issue about the bilevel  
14       controls. I think we are looking at the same  
15       thing as the CEC.

16              We're particularly interested in areas  
17       such as stairwells and corridors and areas where  
18       you have intermittent occupancy. I've had the  
19       opportunity personally to work a lot with this in  
20       a federal building project down in San Francisco.  
21       And the occupancy sensing seemed to work quite  
22       well there.

23              But we're talking about bilevel so that  
24       there is always light in the stairwells and  
25       corridors. I don't think we could get people to

1 go out in the dark. Fifty percent or less  
2 lighting turndown.

3 Dimming or switching or hi/low ballasts.  
4 We think it should be offered first as a credit,  
5 and then mandatory some other time, but we're  
6 still looking at that.

7 Also we're looking at pulse start metal  
8 halide fixtures. We'd like to see a minimum  
9 maintain lamp ballast efficacy for 175 watt  
10 fixtures and up. The efficacies for the pulse  
11 start equipment are about 20 percent greater than  
12 they are with standard metal halide. And this is  
13 pulse start lamps and ballasts together.

14 There's a very wide application of  
15 storage and warehouse areas for this type of  
16 technology.

17 The gentleman earlier pretty much took a  
18 lot of our thunder away from skylighting  
19 enhancement, but we totally agree. We were very  
20 much involved, or I was peripherally involved when  
21 I was in research and development in the --  
22 Project at CSAA, and I think that that's a  
23 wonderful example of how skylights can impact a  
24 single story building.

25 We'd like to see greater use of top

1       lighting. Update the definition of the daylight  
2       zone. What does that really mean in terms of  
3       design and operation of a building. Requiring  
4       automatic controls in the zone. And these can be  
5       very simple photocell controls or even time  
6       clocks.

7               And improving the lighting control  
8       credit for photo controls with top lighting.  
9       Pretty much using a power adjustment factor type  
10      of approach.

11             And that's it.

12             MR. PENNINGTON: Thank you. John.

13             MR. HOGAN: John Hogan, City of Seattle.  
14      Again, my comments were on the table outside. But  
15      I'd like to touch on a couple of controls issues  
16      and then respond to some issues that Charles Eley  
17      brought up.

18             We would recommend that the Commission  
19      require occupancy sensors for small spaces. In  
20      the Seattle Energy Code we require them for spaces  
21      less than 300 square feet. So that's typically  
22      small offices and classrooms.

23             The automatic controls requirements you  
24      have now generally apply for shutoff in the  
25      evening, so you don't waste the light after



1       somebody's gone and nobody's there.

2               People can choose to comply with that  
3       with occupancy sensors, but for people who use the  
4       sleep controls, there's this time during the day  
5       when there's waste and people aren't in the rooms  
6       and you're not capturing that. So having the  
7       occupancy sensors will capture that waste during  
8       the occupied hours.

9               We also require that there be a manual  
10       switch for those occupancy sensors so that  
11       somebody, for instance, can walk into a room, drop  
12       off a piece of mail or a folder, and leave without  
13       the switch being on for 30 minutes. So you can --  
14       it doesn't have to stay on even though the sensor  
15       has picked up somebody there. You can still  
16       switch the light off manually.

17               In terms of daylight areas, we recommend  
18       that the Commission require automatic daylighting  
19       control. In the Seattle Energy Code we allow two  
20       different options. One is either photocell  
21       dimming with continuous dimming, and the other  
22       one's photocell dimming, but it's step dimming.  
23       So lamp by lamp.

24               Obviously the continuous dimming is a  
25       better system because people don't know that it's

1       happening; it just brings the light down  
2       gradually. It's more expensive than the step  
3       dimming.

4               So for our code the recommendation was  
5       to pull out both those technologies at this point  
6       and then at some point in the future we'll switch  
7       to the photocell continuous dimming. But we  
8       recommend also that that be adopted into the  
9       California standards.

10              And once you start adopting all these  
11       requirements, and obviously understand the  
12       importance of having good controls, as well as  
13       efficient lighting, it's time to delete the  
14       lighting control credits. So that --

15              MR. PENNINGTON: Let me ask you about  
16       the daylight controls. What triggers that  
17       requirement?

18              MR. HOGAN: If any light within the  
19       daylighting zone. So, --

20              MR. PENNINGTON: So if you're within 20  
21       feet of the perimeter or you're under a skylight,  
22       then daylighting controls are required?

23              MR. HOGAN: Right.

24              MR. PENNINGTON: Basically something  
25       like that?

1                   MR. HOGAN: Yeah, the Seattle and  
2                   Washington State Code define daylight zone as 15  
3                   feet from the perimeter. And then if you have a  
4                   skylight in the center it's the skylight plus the  
5                   floor-to-ceiling height around the side of that.

6                   MR. PENNINGTON: Okay.

7                   UNIDENTIFIED SPEAKER: Is there any  
8                   minimum --

9                   MR. HOGAN: No, there's no minimum, but  
10                  there's a nuance here to think about. There's a  
11                  requirement that each office or each space have a  
12                  switch to control the lights within that space.

13                  However, the daylighting controls don't  
14                  have to do separate daylight switching for each  
15                  space. So you can have a photocell that would  
16                  control the entire east side of the building that  
17                  might have 12 enclosed offices. And so they could  
18                  all be dimmed with one photocell.

19                  So you don't have to have a separate  
20                  sensor and dimmer for each of those small offices.

21                  MR. PENNINGTON: Okay, thanks.

22                  MR. HOGAN: In terms of the controls in  
23                  the code, it seems it's time to delete that table  
24                  1-L. You want the efficient lighting; essentially  
25                  now that operates as a mechanism where people can

1       install less efficient lighting because they're  
2       saying we're doing these great controls. We want  
3       both of those.

4               To respond to a couple points that  
5       Charles Eley mentioned, talked about some advances  
6       in lighting technology looking at the watts per  
7       square foot for some of the occupancies. In  
8       Seattle we've adopted some revisions. Our office  
9       lighting number is 1.0 watts/square foot, with  
10      some exceptions for small offices to go up to 1.2.

11             Once you go ahead and decide what those  
12      numbers are, and you start thinking about a  
13      prescriptive approach, obviously you have to  
14      develop the watts per square foot, and then you  
15      figure out what a prescriptive approach is that  
16      would work with that. We've had prescriptive  
17      approaches in the Seattle and Washington State  
18      Codes since 1994.

19             Charles mentioned one option where you  
20      have so many watts per fixture and you work with a  
21      spacing on those. Obviously you have lots of  
22      irregularly shaped rooms, and so it can get  
23      complicated.

24             And if you want something that's truly  
25      prescriptive, you're telling people these lamps,

1       these ballasts, these sort of fixtures, and that's  
2       more the approach that's been used in our codes.

3               So it says, for instance, it has to be a  
4       one- or two-lamp fixture. Can't do any three-lamp  
5       fixtures with the prescriptive approach. It's got  
6       to have some sort of louver or reflector, so it  
7       can't have a lens over it that doesn't let most of  
8       the light through. The parabolic diffusers are  
9       fine. It can be lamps up through T8, but you  
10      can't use T10s or T12s.

11              And so a number of these things are  
12      something that an inspector can walk into the  
13      space and say, yeah, that's a T8, or it's not a  
14      T8. It's a two-lamp fixture or it's not. And  
15      we've also required in the past electronic  
16      ballasts with those.

17              So we were comfortable that by using  
18      that approach and not limiting the spacing we  
19      would achieve a comparable watts per square foot.  
20      That was when our lighting power allowance for  
21      office spaces was 1.2.

22              Now that it's going down to 1.0, the  
23      ballast is going to be required to be an  
24      electronic dimming ballast with photocell control.  
25      And that's going to apply in all zones, not just

1 the perimeter daylighting zones.

2 So, often designers will start with a  
3 higher light level and say no, there'll be dirt  
4 and depreciation over time. And they'll start  
5 with a higher level, and over a period of time  
6 they'll presume it comes down to whatever the  
7 minimum acceptable was.

8 By having these dimming controls  
9 throughout you can make sure it's dimmed down to  
10 that level from the start. And so you don't use  
11 as much energy both in the interior zones and then  
12 you get the daylight savings in the perimeter  
13 zones.

14 So, I think prescriptive can be a useful  
15 approach to follow through, but do the watts per  
16 square foot first, and then figure out what'll get  
17 you comfortable savings.

18 Thank you.

19 MR. PENNINGTON: Thank you. Is there a  
20 representative here for Witte Associates? Okay,  
21 they made comment about hotel lobby, and I think  
22 there's a copy of their comments outside.

23 Is there a representative from Watt  
24 Stopper here?

25 MR. JEPSEN: Harold Jepsen from the Watt

1 Stopper. And first a lot of issues have already  
2 been covered with PG&E and Eley and Associates  
3 recommendations.

4 First off, though, is to consider that  
5 lighting control being not something just for  
6 buildings that have conditioned space, but also  
7 for all buildings. That we have millions of  
8 square feet of warehouse space, garages,  
9 manufacturing facilities that presently go  
10 uncontrolled at this point that could benefit from  
11 the energy efficiencies of controls.

12 Another area of change that we would  
13 like to see considered is the ability to manually  
14 turn off the lights as part of the area controls.  
15 That be a requirement so that lights can be turned  
16 off and left off if the occupant so desires.

17 As well as to clarify the relationship  
18 that there is between area control devices and  
19 shutoff controls and how they interact with each  
20 other. Presently there seems to be some confusion  
21 in that area.

22 Next would be to implement, as said  
23 before, the automatic controls for daylighting,  
24 potentially for areas that are continuously  
25 occupied, such as offices and classrooms, to

1       consider to use continuous dimming in those areas.  
2       And then in other areas of intermittent occupancy,  
3       such as corridors, stairwells or warehouses, to go  
4       to a step dimming or continuous dimming would be  
5       acceptable.

6               Next, as was said before, is also to  
7       consider occupancy sensors in all spaces. We had  
8       said less than 250 square feet or 300 square feet  
9       as our constituent from Seattle had mentioned.

10              Also clarify that the override devices  
11       for shutoff controls, that they're limited in the  
12       area to just the ceiling height partitioned areas,  
13       and that they not be allowed to have an override  
14       that potentially can override multiple spaces.

15              I think that there is some  
16       interpretation of the code that allows what is  
17       considered zone override where one override switch  
18       operates multiple rooms when only one person is  
19       occupying it. And we'd like the Commission to  
20       consider that the override be inside the space  
21       that it controls.

22              Next is to consider to control energy  
23       consuming plug loads in individual task spaces.  
24       We've done a lot of work in trying to get the  
25       power density down to 1.2 and 1.0 and 0.8 watts



1 per square foot, yet inside the common cube we  
2 find the small circulating clip-on fans, and also  
3 the 1200 watt space heaters, as well as task  
4 lighting that goes uncontrolled in these spaces  
5 that could benefit from some type of control to  
6 plug loads.

7 We already in our code required a  
8 circuit separately display lighting, and so I  
9 would recommend that we consider making that an  
10 automatic controlled item such that during nonopen  
11 hours of retail stores that lights would  
12 automatically shut off, so that during the  
13 stocking and employee hours when they're taking  
14 care of the store, prior to actually having people  
15 in there shopping, that all the display lighting  
16 would be shut off and they would just have minimal  
17 lighting to work from.

18 Second to last is in concert with the  
19 executive order that came out, D-1901, in March is  
20 it would implement bilevel control for exterior  
21 lighting so that during the retail hours it can  
22 remain at full lights, but during hours of less  
23 occupancy or non retail hours that we can reduce  
24 the light level in parking lots and other exterior  
25 lighting.

1                   Also is to introduce lighting controls  
2           that can shed general lighting in larger  
3           facilities from a single point of control so that  
4           could be utilized for peak load avoidance during  
5           the times of energy alerts; that maybe a building  
6           management person or possibly a signal from the  
7           utility would allow us to go to a lower light  
8           level in order to offset energy crisis concerns.

9                   And lastly is also to also say that  
10          certainly commissioning proper insulation and  
11          certainly commissioning is a very important thing  
12          to allow these controls to effectively do their  
13          energy efficiency operations.

14                   Thanks.

15                   MR. PENNINGTON: Thank you. Yes, sir.

16                   MR. FARBER: Can you talk about plug  
17          load controls? What kind of controls do you have  
18          in mind that might deal with that problem?

19                   MR. JEPSEN: Occupancy sensor based that  
20          work with a plug load strip. That's one of the  
21          things that is available in the industry right  
22          now, where half the strip is controlled by an  
23          occupancy sensor that's rather small and can be  
24          mounted inside or underneath a desk. And the  
25          other half would be where you plug in your CPUs or

1 loads that you wouldn't want to turn off.

2 MR. PENNINGTON: Okay, thank you. Sun  
3 Industries, we found out, is not coming. So there  
4 was a written item that they submitted you can  
5 take a look at.

6 Gary.

7 MR. FARBER: I wasn't going to address  
8 any technology issues, just how lighting is dealt  
9 with in the code, and some code problems I've seen  
10 over the years.

11 First of all, easy way to play games in  
12 the code right now is retail lighting and  
13 performance compliance. You could have a space  
14 that's labeled retail, no tenant yet. Put in low  
15 level lighting. No one's going to complain,  
16 there's no tenant. You get credit for it under  
17 performance.

18 And retail spaces tend to have big  
19 turnovers. I'd like to see no tradeoff for  
20 lighting in performance compliance for retail  
21 spaces. That would plug that problem.

22 Let's see, another thing is retail  
23 lighting in general, the whole definition of  
24 retail tends to create a lot of confusion because  
25 we think of retail buildings, and retail buildings

1       aren't necessarily all retail spaces.

2               Retail buildings often have service  
3       oriented tenants, office oriented tenants like  
4       real estate and tailors, all kinds of different  
5       spaces. If you permit a space as a retail  
6       building now and you say it's all retail, does it  
7       get a retail level of lighting.

8               And I'd like to just eliminate the word  
9       retail from our lighting definitions and use  
10      terminology that's a little bit more direct.  
11      Shopping center lighting, or shopping centers in  
12      general, where there isn't a particular tenant yet  
13      so we don't know whether it's going to be service,  
14      office or merchandise sales.

15              And then, or what one considers retail  
16      where they're actually selling merchandise, call  
17      that merchandise sales. So there will not be any  
18      confusion about what we're talking about.

19              I think we also need to eliminate retail  
20      or merchandise sales or whatever you want to call  
21      it from the whole building compliance, because  
22      that assumes a certain proportion of actual sales  
23      area to stock area, and those proportions can  
24      vary, I think, too much to even have such a  
25      number. So I think any type of retail situation

1       should have to go under the area approach.

2               Wall displays, feature displays, all  
3       that, Charles was talking about that. It's really  
4       confusing. I don't think anyone who wants to put  
5       in a lot of display lighting simply goes over to  
6       the tailored approach and they can do whatever  
7       they want because there's -- probably most  
8       building departments don't know how to deal with  
9       that. And the standards are a little bit loose  
10      there, anyway.

11             I'll give you a for instance. Right now  
12      the standards don't really define what the display  
13      lighting, itself, is. And if you've got a space  
14      that was 100 percent track lighting, well, if you  
15      call it all display lighting, even doing all the  
16      calculations of the wall display and feature  
17      display and all that, you end up with a greater  
18      credit than if you limit the display lighting to a  
19      certain percentage of the total watts, or a  
20      percentage of the total lights, or lights within a  
21      certain distance of the wall. So I think that  
22      needs to be regulated.

23             But beyond that I'd like to just see the  
24      whole thing get simplified, simply say that under  
25      any lighting compliance approach that you simply

1       get a certain amount of watts per square foot of  
2       wall or floor that can't be exceeded by the actual  
3       wattage of the display lighting, which again needs  
4       to be defined. What is the display lighting  
5       versus the general lighting. I think we can  
6       simplify the whole process and reduce the amount  
7       of game playing with that.

8               Thank you.

9               MR. PENNINGTON: Okay. Are there any  
10       other suggested changes related to nonresidential  
11       lighting? Hasheem.

12              MR. AKBARI: Hasheem Akbari, Lawrence  
13       Berkeley Lab. This might be an extension to what  
14       currently Title 24 is really focusing on.

15              We have done some analysis and some  
16       measurements are available in the literature  
17       indicating that objects in a lighter color  
18       background during the evening show up better.

19              As a result the parking areas that are  
20       having the lighter color would require less of the  
21       lighting.

22              And I would like to be able to work with  
23       the Commission in coming up with some innovative  
24       techniques to offer some credit to the parking  
25       areas that are using reflective surfaces for the

1       paved surfaces, rather than dark surfaces.

2               MR. PENNINGTON:   Okay.   Jerry.

3               MR. BLOMBERG:   Jerry Blomberg, SunOptic  
4       Skylights.   I didn't really dwell on the fact that  
5       in the WalMart Stores they used both dimming and  
6       switching.   They have it in 500 stores.   And they  
7       put it in three stores a week as they build them.

8               It works.   And it's available.

9               MR. SALES:   Jack Sales, International  
10       Dark-Sky Association.   I don't know if you had me  
11       down on your other here, or other --

12              MR. PENNINGTON:   Why don't you go ahead  
13       right here.

14              MR. SALES:   Okay.   Good place, okay.   As  
15       I said, I'm Jack Sales from the International  
16       Dark-Sky Association.   My comments don't  
17       necessarily reflect the official position of IDA  
18       but they're based on my experience and the general  
19       concerns of IDA and its 800-plus members.

20              This poster that I'm holding up  
21       represents about 15 gigawatts a year of wasted  
22       energy.   And the large area in the middle is the  
23       Greater Sacramento Area.

24              This is available, this information is  
25       available off the darksky.org website, and the

1 skykeepers.org website. We have information on  
2 Stockton, which is 3.68 gigawatts. Modesto, 3.3  
3 gigawatts. Fresno, 6.6 --

4 COMMISSIONER ROSENFELD: Hold on, you've  
5 now exceeded total California installed power. Do  
6 you mean gigawatt hours?

7 MR. SALES: Per year.

8 COMMISSIONER ROSENFELD: Gigawatt hours,  
9 okay.

10 MR. SALES: Gigawatts per year.

11 COMMISSIONER ROSENFELD: Gigawatt hours  
12 per year.

13 MR. PENNINGTON: Yeah.

14 MR. ELEY: Yeah.

15 MR. SALES: Okay. Yeah.

16 COMMISSIONER ROSENFELD: Okay.

17 MR. SALES: And like I said, this is  
18 available on another website, was calculated by a  
19 doctor in Japan. And based on the data that he  
20 received from the energy suppliers in Japan. And  
21 it's calculations for cities all over the world.

22 We are all concerned about the savings  
23 of the 75 watts of energy with the compact  
24 fluorescent lamp by replacing incandescent with a  
25 compact fluorescent lamp. But we ignore the waste



1 of 150 watts, 200 watts of energy on an unshielded  
2 400 watt flood light.

3 The Commission should aggressively  
4 pursue reduction and waste in energy as a result  
5 of outdoor lighting of all forms. And I think you  
6 heard some on residential, as well.

7 And I certainly support the idea of  
8 bilevel lighting. We should establish that all  
9 upward directed light is wasted energy. All light  
10 that does not fall on the intended target or  
11 application is wasted energy.

12 We should consider adopting standards  
13 based similar to the Australian outdoor lighting  
14 standards that specify upward waste light ratio as  
15 an important measure.

16 We should adopt standards that consider  
17 lumens as well as watts per acre restrictions on  
18 all outdoor lighting.

19 Upward waste light credits could be  
20 established that would allow installation of  
21 cutoff lighting and replace say ten times that  
22 much with full cutoff lighting that doesn't shine  
23 up into the sky and waste energy.

24 We should require the strict compliance  
25 not to exceed the IES recommended lighting levels

1       indoors and outdoors.

2               We should be concerned and control the  
3       mounting height of luminaires in parking lots.  
4       Many cities and counties restrict the height of  
5       parking lot lighting, and that necessarily  
6       increases the energy density.

7               We should require all applications of  
8       outdoor lighting to confine 90 percent or more of  
9       the lumen output of the installation to the  
10      intended target.

11              Require all commercial building mounted  
12      luminaires to be full cutoff, IES full cutoff  
13      definition.

14              Establish an educational program for the  
15      public and electrical industry relating to this  
16      outdoor waste light.

17              We should apply public benefit money to  
18      reducing sky glow as it does truly represent a  
19      waste of energy.

20              And we should also, in looking at some  
21      of the other topics coming up, I also in my  
22      comments had a note about increasing the amount of  
23      PV we have; photovoltaic is, I think, very very  
24      important. Our energy supply should follow our  
25      load. And that's something that I think we should

1           be multiplying hundreds of time, is PV.

2                     Thank you.

3                     MR. PENNINGTON: Thank you. Are there  
4           other comments on nonresidential lighting, or  
5           suggested changes? Yes.

6                     COMMISSIONER ROSENFELD: I guess I do  
7           have a question about light going upwards. And  
8           I'm really just asking if there's some other  
9           people in the audience who are experts. Maybe we  
10          can talk afterwards.

11                    But, it really is sort of astounding.  
12          If you look down from an airplane and if you think  
13          lighting should just go downwards, it just  
14          doesn't. I mean you can see streets where in fact  
15          you see the trees and this pavement and the light  
16          goes down.

17                    But this is shocking part of the United  
18          States where it just looks as if we have bare  
19          lamps.

20                    UNIDENTIFIED SPEAKER: Las Vegas.

21                    (Laughter.)

22                    COMMISSIONER ROSENFELD: I didn't hear  
23          you.

24                    UNIDENTIFIED SPEAKER: Las Vegas.

25                    COMMISSIONER ROSENFELD: That's right.

1 Sacramento's okay, land in Sacramento in the night  
2 sometime. What are the rules on outdoor lighting  
3 and light going upwards?

4 MR. PENNINGTON: There's no such rules.  
5 The Energy Commission just gained authority to  
6 adopt standards related to outdoor lighting in SB-  
7 5X. And that's an aspect of -- well, our  
8 intention is to have a project that's parallel to  
9 this one that develops requirements for outdoor  
10 lighting, along the same timeframe as this --

11 COMMISSIONER ROSENFELD: On the same  
12 timeframe?

13 MR. PENNINGTON: Yes.

14 COMMISSIONER ROSENFELD: What are you  
15 shaking your head about?

16 UNIDENTIFIED SPEAKER: Just agreeing  
17 with you.

18 MR. PENNINGTON: Other suggested changes  
19 related to nonresidential lighting?

20 Okay, going to other now. Mr. Pak, I  
21 asked you to wait hours here before your talk.  
22 Why don't you go first under other if you're  
23 ready.

24 MR. PAK: Thank you. Al Pak for Web  
25 Service. We have proposed two recommendations as

1 part of this proceeding.

2 First, with respect to multifamily  
3 residential housing, we're recommending a standard  
4 that would require gas hookups where in-unit  
5 hookups for clothes dryers are provided, and where  
6 gas is otherwise available at the property.

7 We would apply that standard to new and  
8 existing buildings, where the existing building is  
9 undergoing an alteration. We believe this would  
10 reduce the substitution of in-unit electric dryers  
11 for common area gas dryers.

12 The second recommendation we're making  
13 is more of an administrative one. The Title 24  
14 standards are referenced in the regulations of the  
15 Tax Credit Allocation Committee, which is a state  
16 agency housed in the State Treasurer's Office.

17 That Committee administers a \$100  
18 million low-income housing subsidy. And the money  
19 is allocated amongst applicant developments who  
20 are ranked on a very elaborate 161-point scoring  
21 system.

22 There are a number of inconsistencies in  
23 those regulations when you look at it from an  
24 energy efficiency standpoint. And we have been  
25 working with this Committee on the proper

1 reflection and weighting of energy efficiency in  
2 multifamily laundry facilities.

3 And they have indicated a great interest  
4 in understanding better the interface between the  
5 Title 24 standards and their own regulations so  
6 that the most energy efficient developments are  
7 most likely to receive a portion of these  
8 subsidies.

9 So we would just recommend, as an  
10 administrative matter, that some liaison be  
11 developed between that Committee and this  
12 Commission.

13 Those are our two recommendations. And,  
14 Bill, I provided you with the written handout.  
15 And I understand it's now at the table up front.

16 Thank you.

17 MR. PENNINGTON: One comment I would  
18 make related to your suggestion. The Department  
19 of Housing and Community Development, during the  
20 AB-970 process, were quite interested in I guess  
21 it's a new appreciation that energy efficiency  
22 ought to be considered when looking at affordable  
23 housing.

24 And we're very much interested in  
25 coordinating with this incentives program that

1       you're talking about for multifamily for low-  
2       income housing.

3               So they're another linkage that we might  
4       make with this committee that you're talking  
5       about.

6               MR. PAK: Yeah, I believe they actually  
7       have a non-voting seat on the committee; the three  
8       members of the voting committee are the State  
9       Treasurer, State Controller and some  
10      representative of the Governor's Office. And they  
11      receive advice from different agencies.

12              But absent from any of the advice that  
13      we saw them getting was any advice from this  
14      Commission, the Public Utilities Commission or any  
15      other agency with any energy expertise.

16              And like I said, they're very open to  
17      receiving any advice and recommendations you can  
18      give them.

19              MR. PENNINGTON: Okay, very good, thank  
20      you. Okay, Charles.

21              MR. ELEY: Okay. Would you put the  
22      other measures on that.

23              There's three bullets here I want to  
24      talk about. The first one is photovoltaics. The  
25      current regulations, if you read them, actually

1        permit credit for photovoltaics right now. But  
2        the ACM manuals don't have any -- they don't  
3        reference any kind of procedure for calculating  
4        that credit.

5                The standard for residential says you  
6        don't have to count energy consumption from  
7        nondepletable sources, and PVs would be a  
8        nondepletable source. And the nonresidential  
9        standards have similar language.

10               So this change would consider developing  
11        calculation procedures in the res and nonres ACM  
12        manuals to offer possible credits for  
13        photovoltaics.

14               There may also be some very limiting  
15        restrictions on how these credits would be  
16        offered. I know we've talked to many of you and  
17        there are some concerns about having too large of  
18        a credit for photovoltaics.

19               So that's this particular change. It  
20        would deal with the ACM manuals and the  
21        calculation procedures there.

22               The next code change deals with the  
23        climate zone boundaries, and in just a couple of  
24        targeted areas. The first area is in San Diego  
25        County. San Diego County has actually four



1 climate zones. There's 7 along the coast; then  
2 you move inland a little bit and it's 10; you move  
3 inland a little bit more and it's 14. And then  
4 finally 15, as you move from the strong marine  
5 influence along the coast to the desert, you know,  
6 on the other side of the County.

7 Some people have questioned the position  
8 of the boundary between climate zones 7 and 10.  
9 Seven is a very temperate climate where air  
10 conditioning should not be required. And 10 is a  
11 climate where air conditioning typically is  
12 required.

13 So, the way we plan to look at this is  
14 to look at the -- try and get some building permit  
15 data and see if homes in climate zone 7 along that  
16 boundary actually have air conditioning; and if  
17 they do, that would be a reason to maybe shift the  
18 boundary a little bit to the west. So that's one  
19 location.

20 The other location where the boundary  
21 has been called into question is south of San Jose  
22 in the Gilroy/Morgan Hill area. There's a lot of  
23 home construction down there right now. And it's  
24 a similar kind of situation, but dissimilar in  
25 others.

1                   Homes in San Jose typically have not  
2                   been air conditioned historically, but when you  
3                   move south into the valley it's warmer and the  
4                   homes typically are air conditioned.

5                   The reference city -- this is climate  
6                   zone 4 -- the reference city for climate zone 4 is  
7                   actually Moffat Field, which is north of San Jose,  
8                   and on the water. So the situation may be a bit  
9                   more complicated here. It could be that we have  
10                  the wrong weather file for climate zone 4, and  
11                  maybe the northern part of climate zone 4 should  
12                  be a part of 3 or something.

13                  Anyway, we're going to look at both of  
14                  these questions as part of this. These are the  
15                  two areas where we think it's -- Bob --

16                  MR. RAYMER: Yeah, Bob Raymer, CBIA.  
17                  You, what, probably contact building departments  
18                  to see what's been pulled in --

19                  MR. ELEY: Yeah.

20                  MR. RAYMER: -- in more recent, very  
21                  recent --

22                  MR. ELEY: That's what we're thinking  
23                  would be an approach, you know. If air  
24                  conditioning is going in in 7, then the boundary  
25                  is probably wrong, you know.

1                   MR. PENNINGTON: Before you go on, Brad,  
2                   do you want to come up? This is the liaison  
3                   between the California Building Officials and the  
4                   Energy Commission. He's on the CALBO Board. And  
5                   also is the Building Official in Chula Vista.

6                   MR. ELEY: Okay.

7                   MR. PENNINGTON: He knows this problem,  
8                   or he's --

9                   MR. ELEY: Okay. All right, this is  
10                  your area.

11                  MR. REMP: Thank you very much. Just  
12                  wanted to mention a couple things. We're looking  
13                  at probably adding at least another 25,000 houses  
14                  in this particular area that may be in dispute.  
15                  So this is obviously a good time to take a look at  
16                  it.

17                  And the other thing we would urge is  
18                  don't tie it into the city boundaries, because  
19                  we've done three or four annexations. So, those  
20                  boundaries no longer exist at that location. It  
21                  gets a little confusing.

22                  So, we're anxious to get this sorted out  
23                  and would be more than happy to work with you in  
24                  any cooperative manner that we can. Thank you for  
25                  bringing it up.

1 MR. ELEY: Okay, we appreciate that.

2 MR. PENNINGTON: Thank you very much.

3 Nehemiah.

4 MR. STONE: At the risk of extending  
5 this too long, I will try not to, but --

6 MR. PENNINGTON: You have a minute.

7 (Laughter.)

8 MR. HOROWITZ: -- the problem is you  
9 characterized it for climate zone 4. It probably  
10 isn't as simple as that. Actually require new  
11 weather tapes, because the weather tapes, although  
12 they were originally formed with a reference city,  
13 that reference city is totally irrelevant anymore.

14 Actually the weather tape is based on  
15 the average data, all of the stations within that  
16 climate zone. So if you're finding that problem,  
17 it's not because Moffat Field was originally the  
18 weather station. In '89 and '90 it was totally  
19 untied from that.

20 So I think that you're going to find  
21 that same sort of situation in a lot of places.  
22 And I recommend the Commission consider very  
23 strongly doing the same sort of contract as was  
24 done back in 1989, and revisit all the weather  
25 tapes, particularly since they were developed

1 without any idea of the consideration for peak.

2 At the time we were only concerned with  
3 energy use, not peak reduction -- it was actually  
4 modified downward quite a bit.

5 MR. REMP: How long did that review take  
6 back in '88/89?

7 MR. STONE: Two years. It would  
8 actually be a lot quicker this time because the  
9 process actually had to be invented, and could be  
10 done much quicker today.

11 MR. PENNINGTON: Okay. We're sort of  
12 violating our rules here. You have a quick one,  
13 Steve?

14 MR. GATES: Just very quick. If you're  
15 going to revise the weather tapes, maybe -- the  
16 time dependent valuations, the energy rates --

17 MR. ELEY: That's a good idea.

18 MR. GATES: -- the compliance tools, use  
19 it that way.

20 UNIDENTIFIED SPEAKER: Can you repeat  
21 the comment?

22 MR. GATES: Yeah, the discussions  
23 previously about the time dependent valuations and  
24 how you cost electricity on a time of use basis,  
25 and how you cost gas on a time of use basis, the

1 suggestion was if they're going to consider  
2 revising the weather tapes, to go ahead and  
3 include that data on the tapes for the different  
4 climate zones. So that the compliance programs  
5 directly access that energy data as part of the  
6 weather data.

7 MR. ELEY: That's a good idea. The last  
8 topic I'm going to cover is under the general  
9 category of computer modeling.

10 Several aspects of this have actually  
11 already been covered under residential HVAC where  
12 we raised the question of needing to add equipment  
13 models and under nonresidential HVAC, similar  
14 kinds of things.

15 There's two points here that we were  
16 asked to look at and will. The first one is to  
17 consider EnergyPlus as the reference program  
18 instead of DOE2 or CALRES. EnergyPlus is deemed  
19 by USDOE to be the successor to DOE2.

20 We don't think it's ready yet. Maybe  
21 next round. So, that's probably what's going to  
22 happen there, is we'll look at it and say, well,  
23 it's not ready.

24 The other idea that we're looking at is  
25 to use a procedure called BestTest, which has

1 recently been adopted as ASHRAE standard 140 --  
2 ASHRAE/HANSI standard 140, as a way to verify the  
3 accuracy of calculation engines.

4 Right now the residential and  
5 nonresidential ACM manual have a series of tests,  
6 modeling tests that program vendors have to  
7 perform. I believe there's about 75 tests for the  
8 nonresidential ACM and a similar set for the  
9 residential ACM.

10 Some of these tests could be replaced by  
11 the standard test already in ASHRAE 140. It would  
12 simplify the process for software vendors to bring  
13 products to the market. Because once their engine  
14 had passed these tests, then, you know, they  
15 wouldn't have to do that part. And they could  
16 concentrate on correctly creating the custom  
17 budget building and generating the required  
18 compliance reports.

19 Now, ASHRAE 140 I don't think is  
20 comprehensive enough for what we need to test in  
21 California, so we'd still have to keep many of the  
22 tests in there. But there's a lot of them in  
23 particular dealing with the building envelope,  
24 fenestration, thermal mass and things of that  
25 nature that have been standardized.

1                   MR. PENNINGTON:   Okay, thank you.   PG&E.

2                   MR. BLANC:   Steve Blanc, PG&E.   We've  
3                   already discussed the modular classrooms in our  
4                   first go-round in nonres.   So really the only  
5                   other issue that we have is to support the CEC's  
6                   exemption from NAECA, and that we see it presently  
7                   as a situation where California is preempted from  
8                   adopting what we consider to be appropriate  
9                   appliance standards.   This state has always been  
10                  sort of the leader in this area and in energy  
11                  efficiency generally.   And we'd like to keep that  
12                  up.

13                  The other, I think the three things in  
14                  particular up on the screen are the residential  
15                  AC, air cooled AC and heat pumps; the  
16                  nonresidential counterparts to those; and  
17                  residential water heaters.   And we would also  
18                  include allied efficiency interests in that  
19                  statement.

20                  And that will come out later in our  
21                  studies that are being done by HMG.

22                  MR. PENNINGTON:   How about the standards  
23                  implementation item?

24                  MR. MAHONE:   That was back in --

25                  MR. BLANC:   That was residential; that's



1           why I didn't have that one.

2                   MR. PENNINGTON:   So, can someone cover  
3           that?

4                   MR. MAHONE:   Yeah, I'll talk about it.  
5           This is a residential other topic.   Doug Mahone,  
6           Heschong Mahone Group and PG&E.

7                   One of the other activities that we're  
8           going to be doing as part of this is taking --  
9           sort of stepping back and taking a look at the  
10          enforceability of the entire residential standard,  
11          including all the processes and procedures that  
12          are included in that.   Looking at how the  
13          standards are explained in the manuals; how  
14          they're implemented through the forms and the  
15          software; and what can be done to make it all more  
16          enforceable through the enforcement process.

17                   So, we'll be making general  
18          recommendations for the whole process as a result  
19          of this activity.

20                   MR. PENNINGTON:   Thank you.   Lance, did  
21          you want to speak next?

22                   MR. DeLAURA:   Yeah, actually Ahmed has a  
23          couple of comments on DG.

24                   MR. AHMED:   A.Y. Ahmed, consultant to  
25          Southern California Gas.   The only concern that we

1       have already submitted in written comments. I'd  
2       just like to reiterate.

3               Basically if any credits are given to  
4       photovoltaics and other solar technologies,  
5       similar credits should be extended to all  
6       technologies that reduce peak demand or displace  
7       high cost electricity.

8               So that would include distributed  
9       generation technologies, although DG technologies  
10      for residential are not yet prevalent in the  
11      market, but they are being resourced and developed  
12      right now. And perhaps we can set the standards  
13      to accommodate these technologies as they come  
14      into the market.

15              In addition to that, regarding  
16      microturbines, in addition to microturbines we  
17      also have fuel cells that are currently being  
18      developed.

19              And natural gas cooling technologies  
20      also displace high priced electricity, so they  
21      should also deserve similar credit.

22              And regarding life cycle costs, what our  
23      comment was regarding these different measures,  
24      how the CEC is going to compare the life cycle  
25      costs of the different measures, will they be done

1       in isolation or, for example, say an air  
2       conditioning system, will you assume also that the  
3       ducts are tight and you will include that in the  
4       cost effectiveness, or how it is going to be done.  
5       We're not clear yet. We'd like to get some ideas  
6       on that.

7                   And regarding information, I think our  
8       written comments say that the CEC should share all  
9       information that the CEC receives from all parties  
10      concerned, which I think you're probably planning  
11      to do anyway. And that's all we have.

12                   MR. PENNINGTON: Do you have a question,  
13      Gary?

14                   MR. FERNSTROM: I had a comment, Bill.  
15      Gary Fernstrom, PG&E. I think when the Commission  
16      looks at renewable energy sources, such as  
17      photovoltaics as an alternative to energy  
18      efficiency measures in buildings, it needs to be  
19      mindful that PVs are a renewable resource. And  
20      distributed generation may or may not be a  
21      renewable resource, depending upon whether it's  
22      cogeneration or not.

23                   So, in considering how those  
24      opportunities are treated, I just recommend that  
25      the Commission be mindful of whether the

1       technology being considered is renewable or not.

2                   MR. PENNINGTON:   Okay, thank you.   Okay,  
3       Steve.

4                   MR. GATES:   A few miscellaneous  
5       comments.   Photovoltaics have been brought up a  
6       number of times here and questions as to whether  
7       it be incorporated in the ACM.

8                   We do have a version of DOE2 that's been  
9       out for a year or so that has photovoltaics in it.  
10      It actually is two separate components for when  
11      you'd be specifying photovoltaic array and cell,  
12      and when you specify the inverter that the array  
13      or arrays are linked up to.   It can simulate both  
14      photovoltaic arrays using the manufacturer's  
15      coefficients or the alternative -- method.   So  
16      that's for your consideration there, there is a  
17      tool available that you can use.

18                  Next slide, please.   Another potential  
19      area of regulation that I don't believe the CEC  
20      has ever addressed before and that is transformers  
21      in buildings.

22                  Most buildings, you know, of any size at  
23      all either have a transformer down in the basement  
24      or in the utility room, or transformers floor by  
25      floor in the building.

1                   These transformers, on an annual basis,  
2                   can account for 5 percent or so of the energy  
3                   consumed in the building. Transformers come in  
4                   different efficiencies, although I haven't  
5                   investigated them in detail, but I understand that  
6                   transformers that have a higher peak efficiency  
7                   tend to actually have a lower part load  
8                   efficiency. And that has to do with the amount of  
9                   iron that's in the transformer, and the associated  
10                  magnetization losses that you encounter during  
11                  operation.

12                  DOE2 has the capability of looking at  
13                  transformers. So, again, I wanted to just  
14                  identify this as a potential area, since it is a  
15                  non trivial consumer of energy in the State of  
16                  California.

17                  Next slide, please. In the material  
18                  that you had distributed prior to the meeting you  
19                  mentioned considerations or concerns about load  
20                  shedding, and various types of load shedding  
21                  strategies.

22                  I mentioned earlier today that most  
23                  common HVAC equipment in the State of California  
24                  is probably the packaged rooftop equipment in the  
25                  ten-ton range or so. Those units typically have

1 two compressors. It would be a relatively trivial  
2 matter in terms of a load shedding program to set  
3 up a program where you could knock one of those  
4 compressors off line during peak times.

5 That way the building would still have  
6 cooling, but certainly not as much cooling as they  
7 had.

8 In terms of doing something like that it  
9 would also make sense to incorporate that with  
10 the, well, in terms of future units, anyway, with  
11 the stage volume approach that we talked about  
12 earlier where you actually modulate air flow in  
13 those units to match it with the actual compressor  
14 capacity that you're using.

15 Next slide, please. This set of  
16 comments are on the alternative compliance manual.  
17 As some of you know, Hirsch and Associates is in  
18 the process of preparing a set of compliance runs  
19 to certify eQUEST for compliance in the State of  
20 California.

21 As part of that we've run into a number  
22 of issues in the existing ACM manual that we'd  
23 like to identify to the Commission. If you're  
24 interested in going into these now I'll go ahead  
25 and list them now. I don't know that this is

1       necessary to discuss as part of this workshop, or  
2       whether you'd rather have the time reserved for  
3       other people and other comments.

4               MR. PENNINGTON:   Why don't you move to  
5       the next comment.

6               MR. GATES:   Okay.   This is my last  
7       comment, actually.   The next section was another  
8       plug for DOE2 versus EnergyPlus, but that appears  
9       to be a moot issue for this set of standards, so I  
10      don't think we need to talk about it.

11              Thank you very much.

12              MR. PENNINGTON:   Thank you.   Gary.

13              MR. FERNSTROM:   Bill, Gary Fernstrom,  
14      PG&E.   Transformers are currently a recommended  
15      measure for adoption in the Title 20 process, just  
16      as Hirsch just suggested.   Thank you.

17              MR. PENNINGTON:   That's what I thought,  
18      but I'd forgotten what was going on there.

19              MR. ELEY:   That's right.

20              MR. PENNINGTON:   Okay.   Manuel, do you  
21      want to do a couple of items here, or Tony?

22              MR. ALVAREZ:   Yeah, Manuel Alvarez,  
23      Southern California Edison.   We submitted two  
24      additional items for the Commission's  
25      consideration on the building standards, and they

1 both relate somewhat to the peak energy problem  
2 we're having.

3 The first one we're asking the  
4 Commission to consider is under voltage protection  
5 devices for residential air conditioners.

6 And the second item we're asking the  
7 Commission to consider is air conditioning cycling  
8 standards, some infrastructure and communications  
9 protocols for some load reduction.

10 We've got a copy of your matrix and will  
11 be filling that out and submitting that to the  
12 Commission for consideration. And look forward to  
13 further discussion.

14 MR. PENNINGTON: Okay. Thank you. Is  
15 Eric DeVito here?

16 MR. DeVITO: Eric DeVito, Cardinal Glass  
17 Industries. I'm just going to take this  
18 opportunity real quick to say again that the  
19 comments we filed are out on the table, and so are  
20 the basic slides that I've shown up here today.  
21 The comments are pretty brief, only three pages.  
22 That's uncharacteristically short for me, so you  
23 should take advantage of it.

24 (Laughter.)

25 MR. DeVITO: If you remember at the



1       beginning, too, I kind of broke down our top  
2       priorities which had the three items listed, and I  
3       said there were some other beneficial changes we  
4       would recommend, too.

5               And we're basically on that page now,  
6       and we're down to the bottom two. And the second-  
7       to-last one there would be improved cost effective  
8       prescriptive fenestration insulation and other  
9       performance values.

10              I guess I would just throw out that  
11       anytime you upgrade a standard we think it's a  
12       good idea to take a look at all of the  
13       prescriptive values you have in the code. No  
14       better time to do it. You just want to see if the  
15       cost/benefit calculations are still checking out;  
16       how far the market's come since you did the last  
17       standards. So we'd just throw that out there.

18              Specifically, in terms of our industry,  
19       we'd recommend possibly taking a look at the U  
20       factor requirements. I know that was suggested in  
21       the order after the AB-970 proceeding, that that  
22       was maybe one thing to take a look at for the  
23       future. So I'll just throw that out there. But,  
24       you know, the other measures certainly would  
25       warrant a good look, too.

1                   The last item on our list is an existing  
2           buildings item, and I think Doug Mahone said it  
3           earlier, too, and I'm kind of surprised someone  
4           else also recommended this, because I thought we  
5           were kind of crazy when we threw it out there,  
6           too.

7                   But, there are only so many bites of the  
8           apple, I guess, existing buildings. So one of the  
9           things we thought is maybe at certain events in a  
10          building's life maybe the Commission can jump back  
11          in and get involved and see what type of energy  
12          efficiency improvements they can recommend at that  
13          time.

14                   We listed four items in our comments.  
15          I'll just go through them real quickly. For  
16          example, when the building is sold; possibly when  
17          the HVAC equipment is replaced; or when there are  
18          other major improvements or triggering events, and  
19          those would obviously have to be hashed out and  
20          determined. But, just some point in a building's  
21          life where you can get back in there and see if  
22          there are other energy efficiency improvements  
23          that you can try and work into the structure.

24                   And I thank you to the staff for putting  
25          on this workshop today, and, Commissioner

1       Rosenfeld, and I appreciate the opportunity to  
2       offer these comments. Thank you.

3               MR. PENNINGTON: Thank you. Dave, did  
4       you want to make another comment? Dave Ware.

5               MR. WARE: Dave Ware representing Owens  
6       Corning, Manager of Codes and Regulation.

7               Had a couple items here. One was base  
8       case modeling assumptions. And as I mentioned  
9       earlier in the residential section there's a lot  
10      of interest these days in EnergyStar level of  
11      building efficiency. And I think that there could  
12      be a lot of support for using envelope and window  
13      and equipment efficiency levels for the base case  
14      modeling assumptions.

15              There is some changes that are  
16      undergoing in the State of California with DOE now  
17      regarding the EnergyStar level for California  
18      EnergyStar. And we already know, for instance,  
19      that in many climate zones EnergyStar level is  
20      actually below Title 24.

21              So we could actually increase the  
22      overall building efficiency by setting that  
23      standard base case level at a better level than we  
24      have now, and actually begin moving up, forcing  
25      up, if you will, or helping to push up the level

1 of the feds for higher performing buildings.

2 Likewise, related to that issue is some  
3 of the dissimilarity between the HERS based  
4 assumptions that are used to produce the actual  
5 five star or the rating number, and you know, an  
6 80 or an 86 level, with the modeling assumptions  
7 that are used for Title 24.

8 So I think the time is right to consider  
9 the differences in the modeling assumptions and  
10 look at the advantages of bringing some of those,  
11 if it's possible, to bringing some of those  
12 modeling assumptions together so that we really  
13 don't have two separate things happening in the  
14 marketplace.

15 Many of the utilities are using the HERS  
16 rating procedure as a standard and benchmark to  
17 set and rate higher performing buildings, but the  
18 process for that is different than Title 24.

19 And so I think that there's an advantage  
20 here and an opportunity to bring those two closer  
21 together.

22 The other thing I want to mention is I  
23 didn't earlier talk about water heating tradeoffs.  
24 There's an immense number of space conditioning  
25 tradeoffs that go on with the building standards.

1 And there's a possibility of likewise setting a  
2 separate water heating budget that I mentioned  
3 earlier, setting a separate space conditioning  
4 budget. Or alternatively setting a -- disallowing  
5 certain kinds of space conditioning tradeoffs to  
6 occur with certain kinds of building envelope  
7 measures. So you maintain a higher performing  
8 envelope overall than what you have now.

9 Thank you.

10 MR. PENNINGTON: Thank you. Okay, Gary.

11 MR. FARBER: City of Los Angeles or --

12 MR. PENNINGTON: Oh, I'm sorry. The  
13 City of Los Angeles is not here today, so --

14 MR. FARBER: Okay.

15 MR. PENNINGTON: You can speak for them  
16 if you wish. Manuel.

17 MR. ALVAREZ: I didn't see their writeup  
18 outside. Was it provided, or did I just miss it?

19 MR. PENNINGTON: Yes, it was provided.  
20 It may have been that you came a little bit later.  
21 But we made some new copies at lunch break so they  
22 should be out there now.

23 UNIDENTIFIED SPEAKER: You know, first  
24 of all it doesn't say City of Los Angeles except  
25 for the back page.

1                   MR. FARBER: Gary Farber, Farber Energy  
2                   Design. A few miscellaneous ideas here. Lighting  
3                   requirements, we ought to consider extending  
4                   lighting requirements to building occupancies that  
5                   are currently exempt, such as historic buildings.  
6                   Historic buildings are exempt because of the light  
7                   fixtures that they need to use. Perhaps we could  
8                   include lighting power, but give them the  
9                   allowance of using screw-in fluorescents to give  
10                  them a little more flexibility. But something to  
11                  consider there.

12                 I occupancy buildings, I don't see why  
13                 you can't include those, if we exclude, you know,  
14                 surgery rooms and critical areas like that.

15                 Buildings outside the human comfort  
16                 range. Right now the standards exclude all  
17                 buildings outside the, you know, outside 55 to 90  
18                 degrees. And I think we ought to consider  
19                 including lighting compliance in those buildings,  
20                 as well.

21                 And then I already mentioned earlier  
22                 envelope compliance extending, envelope compliance  
23                 also to I occupancy buildings and buildings  
24                 maintained outside the human comfort range.

25                 Climate zones. Talk about some issues

1       in San Diego and San Jose area. I think we ought  
2       to explore whether we actually need to add a few  
3       more climate zones. I think there's some  
4       transitional areas.

5                You know, this idea of you're located  
6       either in a cooling zone or a heating zone, you  
7       know, obviously there's some transition areas that  
8       are, you know, equal between heating and cooling.  
9       And seen a lot of areas.

10               A big for instance is we've got climate  
11       zone 12 for the central valley; and then we've got  
12       climate zone 16 in the mountains. We've got  
13       nothing in between, there's no transition at all.  
14       And there's some communities there that are kind  
15       of split between the zones. And there are a lot  
16       of areas that really fall in between those.

17               But the same thing happens like for  
18       instance near the San Francisco Bay Area. We've  
19       got this climate zone 3 which is pretty cool, and  
20       climate zone 12, they come together. And there  
21       are areas, probably a relatively small area, but  
22       maybe we need some transition zones in some areas  
23       between the two other zones.

24               Existing -- enforcement. I think  
25       enforcement is something we really need to, you

1 know, consider how we can improve that. I just  
2 did a plan review for a building that went through  
3 PG&E's Energy By Design performance evaluation,  
4 and found a very large number of problems with the  
5 whole compliance report, as well as with the  
6 plans. But there were some very large problems  
7 with it.

8 This was for a high rise building in San  
9 Francisco. And it's not uncommon. I don't do  
10 that much energy plan review these days, but I  
11 used to do a lot of it. And the percentage of  
12 buildings that were, you know, not in compliance  
13 was pretty astounding.

14 And I have a feeling that, you know, I  
15 understand that the Energy Commission's not doing  
16 any evaluation of building permits any time  
17 recently, is that right? Right, so --

18 (Laughter.)

19 MR. FARBER: Yeah, so I think, you know,  
20 that would be, at the minimum we need to start,  
21 you know, doing that to make sure the building  
22 departments know that they're being looked at.  
23 But beyond that I think we need to explore some  
24 other alternatives.

25 I'd like to see maybe the Energy



1 Commission and the utilities get together and  
2 consider the idea of creating some kind of third  
3 party plan review things to take the work off the  
4 building departments. You know, work in  
5 conjunction with them to do that.

6 I think perhaps the building energy  
7 analysts could be a licensed profession. Put a  
8 lot more onus on them to do the work right if they  
9 were a licensed profession. Then automatically  
10 you know if you're messing up you might lose your  
11 livelihood if there's oversight, you know.

12 If there was such a thing we could even  
13 allow building departments to allow the licensed  
14 energy consultant to review the plans and stamp  
15 the plans, as an option, so they could, you know,  
16 do the whole process, you know, before the final  
17 submittal. And, you know, as long as we had a  
18 strong review system to review the work that these  
19 people are doing. I think we'd have a much higher  
20 rate of compliance than having the building  
21 departments do the final review for the energy  
22 compliance.

23 MR. PENNINGTON: Okay, thank you. Yes.

24 MR. AKBARI: Hasheem Akbari. Many of  
25 the comments regarding to the issue of the climate

1       zone and computer modeling. I think that the  
2       issue of the recordings mentioned here is of  
3       utmost significance because there is a topic which  
4       is known as heat islands.

5                   And if we do not account for that  
6       typically what we would do is that for all the  
7       energy efficiency measures we would consistently  
8       or generally are biased both toward the lower  
9       credit for the energy efficiency measures that  
10      apply to cooling; and biased or over-biased toward  
11      the higher efficiency measures in the heating  
12      season.

13                   So I would suggest that this issue to be  
14      addressed by the Commission more closely, and  
15      probably some tables to be developed. And in  
16      those tables to try to adjust the numbers of the  
17      simulations based on the location of the buildings  
18      whether at least they are in the rural or in the  
19      urban areas.

20                   MR. PENNINGTON: Okay. Mike.

21                   MR. GABEL: Mike Gabel. Comments along  
22      the same lines. However the Commission chooses to  
23      do weather tapes, and modifying the weather tapes  
24      for the simulation, the microclimates and using  
25      design data, however that's done, that was being

1       done actually better in '95. And then it was  
2       dropped. It's out of the compliance programs, and  
3       I won't go into reasons why. Something that was  
4       done in DOS and wasn't redone in Windows.

5               But because of TDVs and other issues  
6       it's really important that the Commission focus  
7       really heavily on this microclimate within the  
8       climate zone, relation to part load, sizing of  
9       equipment, et cetera. Charles and I have talked  
10      about his, but I want to make sure on the public  
11      record that this has been brought to the  
12      Commission's attention.

13             Thank you.

14             MR. PENNINGTON: Thank you. Yes.

15             MR. HOGAN: John Hogan, City of Seattle.

16      I wanted to let the Commission know that Pacific  
17      Northwest National Laboratories has been doing  
18      some work on climate zones. And they've been  
19      doing this on a national basis.

20             And their thrust might sound like it's  
21      going a little different direction. They're  
22      proposing actually a fewer number of climate zones  
23      so it's easier for enforcement. So most states  
24      will have, you know, three or five climate zones,  
25      not so many zones.

1           I think it's important that's some  
2       material that can be looked at, and I think that  
3       will be proposed into the IECC. You may see that  
4       early next year or something, to be aware of.

5           I think it's important to distinguish  
6       between how many zones you use for prescriptive  
7       requirements versus how detailed modeling needs to  
8       be when people go through energy budgets or doing  
9       tradeoffs.

10          I think it's simpler again for training  
11       and for contractors if there's a fewer number of  
12       prescriptive zones so the requirements aren't so  
13       different.

14          Obviously when people do tradeoffs you  
15       want it to be appropriate for their locale. So,  
16       you know, have 25, have 100 different weather  
17       tapes so that when people do the tradeoffs or  
18       energy budgets they do it correctly.

19          MR. PENNINGTON: Okay. Yes.

20          MR. AKBARI: Hasheem Akbari. I forgot  
21       to mention this very important point. The issue  
22       of the heat island is utmost important when there  
23       is a transitional climate.

24          I concur with John's comment that when  
25       it comes to the national climate and you are

1       either in the white or in the black area, either  
2       it is hot or it is very cold, you do not have that  
3       much of an issue.

4               But when it comes to using the Moffat  
5       Field data in order to design the systems in the  
6       southern part of San Jose, as the representative  
7       climate, you are going to have errors of up to a  
8       factor of 2 or 3 sometimes in giving credit to the  
9       energy efficiency measures.

10              Thank you.

11              MR. PENNINGTON: We're ahead of schedule  
12       here, and there's a couple of items that were in  
13       PG&E's comments that I'm wondering if you might  
14       like to take the opportunity to spend a couple of  
15       minutes on each.

16              One was related to the AB-970 valuation  
17       that you did. And the other was related to your  
18       Title 20 initiatives.

19              Sorry for the surprise, but I didn't  
20       think we'd be ahead of time.

21              MR. MAHONE: Yeah, well, okay.

22              (Laughter.)

23              MR. FERNSTROM: Gary Fernstrom, PG&E. I  
24       can talk about Title 20 very briefly. We have  
25       undertaken a similar improvement initiative with

1 Title 20 to our efforts in Title 24. And for the  
2 purpose of cross-reference we've listed those in  
3 our submittal to the Energy Commission. So anyone  
4 that wants to find out what's going on there can  
5 just look it up in the document.

6 Thank you.

7 MR. MAHONE: On the issue of the AB-970  
8 code changes, Nehemiah Stone will be able to talk  
9 about that. Negotiating with the audiovisual  
10 people to if they can project some of these  
11 results up, since we didn't have the foresight to  
12 bring transparencies.

13 MR. PENNINGTON: I think that will work.

14 (Off-the-record remarks.)

15 MR. STONE: This is also in the handout.

16 MR. MAHONE: Yeah, this is straight from  
17 the handout.

18 MR. STONE: Let me give a real brief  
19 description first of what we did. We used the  
20 Energy Commission's methodology that the  
21 Commission used in estimating the energy and peak  
22 impacts from the AB-970 standards changes, both  
23 residential, nonresidential and appliance  
24 standards.

25 We made some modifications to it, partly

1 to make sure that we were being conservative and  
2 not over-estimating anything that we did.

3 We also, on the appliance standards,  
4 looked at things at the point where they came into  
5 the standards. So the first year is actually  
6 2002, whereas in the Commission analysis the first  
7 year is the first year of each standard, each  
8 element that came into the standards.

9 So we have somewhat different numbers.  
10 Ours are typically smaller. In the residential  
11 area you'll see that they're actually a little bit  
12 larger and that's because we counted the energy  
13 from multifamily and additions and remodeling,  
14 which the Energy Commission traditionally has not  
15 counted.

16 We believe it's important to count that  
17 now since we expect that with the change in  
18 demographics in California, multifamily is going  
19 to be becoming a much larger element of the  
20 residential construction.

21 The second thing we did then was to  
22 figure out what the relative importance was of the  
23 investor owned utilities involvement in the  
24 standards process. And we did that through a  
25 fairly large matrix looking at a number of

1 different elements where somebody could  
2 participate. In other words, funded the research  
3 that developed the rating methodology. Or  
4 proposed the standard, itself. Or did the  
5 lifecycle cost analysis. Or just came to the  
6 meetings and supported it.

7 And looking at those, we then made what  
8 had to be a subjective call at the end of it to  
9 figure out, well, the utilities are then X percent  
10 responsible for whatever the value of this change  
11 to the standards was.

12 And very conservatively, if you take a  
13 look at what we came up with, and in the overall  
14 view, utilities are responsible for approximately  
15 a third of the value of the changes.

16 Now, I'd like to reemphasize that we  
17 took a very conservative approach at every point.  
18 So considering this is the low end, I think you  
19 could bump it up quite a bit and still be safe.

20 The main point of this is that if you  
21 think about what you've built as a power plant  
22 these days, you get one of those every three years  
23 in terms of what the utilities brought to the  
24 standards process. It's a very valuable  
25 contribution, and the main reason we did this is



1 we would like to see that contribution appreciated  
2 and supported, and we'd like to see it continued  
3 in the long term.

4 MR. PENNINGTON: Okay, thank you very  
5 much. Are there any other people that would like  
6 to make any final proposals that you haven't  
7 spoken to? Come forward, please. Go ahead,  
8 Elaine.

9 MS. HEBERT: Hi, my name is Elaine  
10 Hebert and I'm going to take off my Energy  
11 Commission Efficiency hat and put on my other hat,  
12 which is as President of the Northern California  
13 Solar Energy Association. This is a volunteer  
14 position that I do outside the Energy Commission  
15 work.

16 And if I were to bring you the stack of  
17 documents that the Energy Commission published in  
18 the late '70s and early 1980s on solar energy it  
19 would be quite an impressive stack. I'd need a  
20 wheelbarrow to get it in here.

21 And for the 20 years that have passed  
22 since then I think that we haven't much supported  
23 the work, all the resources that went into those  
24 documents. I think that we're severely under  
25 utilizing the solar energy resource that falls on

1 California free every day in most parts of the  
2 state.

3 Now, those documents were put out before  
4 photovoltaics came around, so they were mostly  
5 about passive solar design, solar hot water and  
6 orienting the buildings properly to take advantage  
7 of the sun, and to keep the sun out at the times  
8 when you want to in the summer.

9 And these principles helped the building  
10 reduce the air conditioning load at peak and off  
11 peak times for the life of the building.

12 So I just want to remind us about that,  
13 and to see if there's some way that the Energy  
14 Commission can get back to that, supporting either  
15 an alternative building package returning to a  
16 solar package house. And somehow publicizing it  
17 more, somehow getting the word out that this is  
18 available and creating a demand among the public  
19 that this is an alternative that can work and can  
20 save on energy bills for the life of the building.

21 And if you start to add generation on  
22 site with photovoltaics, for example, you begin to  
23 approach a concept of a net zero energy building,  
24 which the federal government is now supporting.  
25 And four contracts have been awarded. Two to

1 companies here in California, ConSol and the Davis  
2 Energy Group, to start looking at how we can  
3 approach creating very efficient buildings, and  
4 making some electricity on site so that you can  
5 practically net zero the energy use for that  
6 building.

7 So, I just want to be on record to say  
8 that, and thanks.

9 COMMISSIONER ROSENFELD: Elaine, I have  
10 a question for you. I don't quite understand  
11 whether -- in some sense on passive solar we've  
12 won. I mean you get credit for good windows and a  
13 white roof and low air conditioning and thermal  
14 mass. So, we've built passive solar into the  
15 standards already.

16 Now are you suggesting extra credit? I  
17 mean I really don't understand what you're driving  
18 at.

19 MS. HEBERT: I think I'm suggesting  
20 publicizing a lot more that this is available and  
21 that it works. We've hardly use passive solar  
22 design principles. There aren't very many houses  
23 that are being built. They're not oriented  
24 properly.

25 That may start to get into land planning

1 issues which may be beyond what we do, maybe not.  
2 But it's a rare case where we're building the  
3 house so it's oriented properly with the proper  
4 overhangs and -- it's just not happening very  
5 much.

6 COMMISSIONER ROSENFELD: But I guess I'm  
7 too dumb to understand how that fits into this  
8 standards business, because we do give the  
9 correct, I hope, credit.

10 MR. STONE: Can I address that just a  
11 little bit? Actually we used to, but it's been  
12 bit by bit taken out so that now orientation  
13 doesn't make anywhere near the difference it used  
14 to. Shading doesn't make anywhere near the  
15 difference it used to. Solar heating coefficient  
16 is now, it's the same for all four orientations,  
17 and it's irrelevant of what the orientation is.

18 Package A, which was the solar package,  
19 was eliminated during the AB-970 standards. So,  
20 actually the standards have moved, step by step,  
21 away from simple, good solar design.

22 COMMISSIONER ROSENFELD: I guess if I  
23 can ask one more question. This is either  
24 shocking or I don't understand it very well.

25 If the computer programs aren't correct,

1       and I guess we all tend to believe them, I thought  
2       I did, then if you do decent shading of south and  
3       west windows and so on you ought to get the right  
4       credit for it.

5                   I don't understand how you can remove  
6       that feature.

7                   MR. PENNINGTON:   That's a question to  
8       me, apparently?

9                   (Laughter.)

10                  COMMISSIONER ROSENFELD:   Yes.

11                  MR. PENNINGTON:   I don't think we have  
12       removed those credits. We had this idea back in  
13       1980 that we would make passive solar buildings  
14       the crux of the standards, and that would be the  
15       reference and we would try to drive all building  
16       that way.

17                  That didn't turn out to be a popular  
18       approach, particularly with highly thermal mass  
19       buildings, or really large, you know, exactly  
20       oriented glazing.

21                  So the standards have been generalized  
22       to apply to other kinds of features that are more  
23       universally acceptable. And now have expectations  
24       for excellent shading on all facades.

25                  For the average production home we don't

1 track thermal mass, primarily because that had  
2 become either a game or an incredible hassle,  
3 depending on your point of view, to track  
4 relatively minor changes in thermal mass.

5 So now the standards have been changed  
6 to the point where if there is a very conscious  
7 design to have a passive building, and you have a  
8 serious effort to get beyond normal thermal mass  
9 into the building, that you get credit for that.  
10 And that's accounted for in the compliance models.

11 But I think there's different points of  
12 view here in terms of whether or not a passive  
13 design ought to be the hallmark of the standard or  
14 not, or beyond the standard, or you know, what  
15 your view is on that.

16 COMMISSIONER ROSENFELD: And the other  
17 remark --

18 MS. HEBERT: Every time we plan, as  
19 NCSEA, whenever we plan an event such as a tour of  
20 solar homes or a seminar on solar energy since the  
21 energy crisis the response has been overwhelming.  
22 People are hungry for information about solar and  
23 how it can apply to their lives.

24 And as a small nonprofit organization  
25 for part of the state we fill a little bit of that

1 gap, but we don't have the resources to do it.  
2 And it would be great if we got more support, or  
3 the Energy Commission undertook some kind of  
4 program to educate people that this is an option  
5 so they'll demand it more. And so the builders  
6 are also educated and know that it's an option.

7 COMMISSIONER ROSENFELD: I tend to agree  
8 with you, but it seems to me this isn't quite the  
9 right forum. If I understand the solar credits  
10 correctly, we, the Energy Commission, or the  
11 Legislature through the Energy Commission, is  
12 spending a huge amount of money. It's like \$20  
13 million a year by giving credit of \$4.50 per  
14 watt --

15 MS. HEBERT: PV is not passive solar  
16 design.

17 COMMISSIONER ROSENFELD: Okay, fine, all  
18 right. So you're talking about maybe passive  
19 solar.

20 MS. HEBERT: I'd like to suggest the  
21 building as a system, --

22 COMMISSIONER ROSENFELD: All right, I  
23 misunderstood.

24 MS. HEBERT: -- the whole thing. Thank  
25 you.

1                   MR. PENNINGTON: Jerry. Thank you,  
2 Elaine.

3                   MR. BLOMBERG: Since photovoltaic has  
4 come up, photovoltaic at \$4.50 buydown for array  
5 or whatever, what WalMart has done, if they did it  
6 all in the State of California, to have an  
7 equivalent amount of PV would cost \$550 million.  
8 And then somebody else would have had to put in  
9 another \$450 million or \$550 million, depending on  
10 whatever you want to use for what the market is  
11 out there. And so that would make \$1.1 billion  
12 against \$55 million.

13                   And so that's one of the reasons that  
14 it's totally inconsistent for the state to have a  
15 buydown like that, and then ignore putting  
16 daylighting as a prescription in the standard.  
17 So, anyway, that's a point.

18                   The other deal is that before this  
19 becomes implemented there will be skylights with  
20 automatically controlled movable shutters that  
21 would have an R19 or better. And so you could  
22 take almost any houseplan, any orientation, and  
23 make it semi-passive; get all the benefits from  
24 the exposure to the sky. And if you wanted to  
25 make it a bigger project you could introduce



1 thermal mass and skylights that rolled off the  
2 opening so you could radiate to the sky, and get  
3 very close to a zero energy building.

4 But anyway, when you write the standard  
5 make it easy for innovative energy efficiency  
6 measures to be done by people, because that's how  
7 we'll find out the way to do it better. And don't  
8 make it so that the building department says, oh,  
9 that's not in the standard, you can't do that,  
10 forget it.

11 So, anyway, I'm looking forward to a day  
12 when we can have zero energy buildings by just  
13 implementing what's available from the sky.

14 MR. PENNINGTON: Thank you.

15 MR. ROPER: Hi, my name is Marc Roper.  
16 I work for AstroPower, which is a manufacturer of  
17 photovoltaics. We're very actively engaged in the  
18 California market, selling our products into grid-  
19 tied applications.

20 And I just wanted to go on record as a  
21 representative of the PV industry in saying that  
22 we support and encourage development of the ACM  
23 procedures for calculating credits towards the  
24 efficiency standards for photovoltaics.

25 Particularly those that recognize the

1 TDV benefit, and hopefully those that are not  
2 overly complex for the residential market  
3 specifically.

4 I thought I would just provide a couple  
5 of data points. There's a mainstream homebuilder,  
6 one of among many that we're working with in San  
7 Diego, which has recently adopted photovoltaic as  
8 part of their energy efficiency package. And we  
9 estimate that the energy savings from the small  
10 nominal photovoltaic array that's being  
11 implemented by this builder is equivalent to the  
12 savings of all of the other Title 24 measures  
13 combined on the baseload energy consumption of the  
14 building.

15 My own personal experience is that I've  
16 used about 200 kilowatt hours in my very normal  
17 conventional 2700 square foot home in the central  
18 valley here since March. And I have a 2400 watt  
19 PV system on my home.

20 So, in any event it's a technology that  
21 works. It's cost effective with the support that  
22 is being provided by the state now. It's easily  
23 verifiable, very high TDV benefit, and it can  
24 really contribute significantly to the energy  
25 demand in buildings and specifically residential

1 buildings.

2 So I wanted to say that AstroPower is  
3 very happy to provide its assistance to the Energy  
4 Commission in developing these ACM procedures.  
5 And thanks the Commission very much for its  
6 support of photovoltaics.

7 MR. PENNINGTON: Thank you, sir. Bruce.

8 MR. MAEDA: Bruce Maeda, Energy  
9 Commission Staff.

10 While it has less of an impact now with  
11 shading being applied to all glazing orientations,  
12 I still believe the definitions of the  
13 orientations need to be changed in the standards  
14 because of the high nonlinearity of the amount of  
15 solar radiation that falls on vertical glass.

16 And I've made this point a few times in  
17 the past. But I think there should be like very  
18 narrow bands about north and south should be  
19 defined as north and south, so that all the  
20 applications of requirements for north and south  
21 be limited to relatively narrow bands about north  
22 and south.

23 I suggest plus/minus 22.5 degrees from  
24 true north or south as being the north and south  
25 areas; and east and west covering the rest.

1           In a similar sense multiple orientation  
2       compliance should be done in a non cardinal basis.  
3       Either it should be done on four non cardinal  
4       directions, or it should be done on eight  
5       orientations and be the worst of eight  
6       orientations in order to get multiple orientation  
7       compliance.

8           Sky orientation, particularly the  
9       definition of skylights for residential compliance  
10      should be treated as horizontal glazing up to a  
11      tilt of 60 degrees where the cosine of the angle  
12      is .5, similar to nonresidential definition of  
13      skylights. So that they are treated as  
14      essentially a different type of glass.

15           And in terms of compliance purposes they  
16      should be treated as twice their area of west  
17      facing glass for packages.

18           In addition, standards, in order to take  
19      advantage of passive or climate tempered buildings  
20      as being the basis of the standard, should have  
21      glass orientation of 20 percent east and west, on  
22      the east and west sides, and 30 percent on the  
23      north and south sides, so you do begin to get  
24      solar tempered buildings as being the true basis  
25      of the standards.

1                   And finally, the Subdivision Map Act  
2           gaps on allowing -- there are some requirements  
3           for solar orientation in the Subdivision Map Act,  
4           but the exceptions are so big you can drive trucks  
5           through it. And they need to be tightened up.

6                   MR. PENNINGTON: Thank you. Mazi.

7                   MR. SHIRAKH: Mazi Shirakh, CEC Staff.  
8           I just had a short comment on the PV. There's  
9           been some concern that if we allow tradeoffs for  
10          photovoltaics somehow other more efficient  
11          building features will get traded away, like  
12          insulation and better glazing.

13                   I don't think that is a problem. I  
14          think that economics will prevent that from  
15          happening. PVs are simply too expensive at about  
16          \$8 per watt. No builder in this state is going to  
17          trade away insulation for PV. So, you know, this  
18          concept of a tin can with PVs on top is not going  
19          to happen.

20                   However, PVs will come in handy in tight  
21          compliance situations where somebody wants to put  
22          in a larger AC unit, or glazing beyond whatever  
23          percentage it would come in.

24                   In the future if somehow PVs become dirt  
25          cheap and people start building tin cans with PVs

1 on top, then we may want to revisit this issue.  
2 But currently I don't think that is a problem.

3 MR. PENNINGTON: Okay, thank you. Yes,  
4 Steve.

5 MR. GATES: Yes, I'd like to just make a  
6 comment on passive buildings, or climate tempered  
7 buildings, or whatever you want to call them.

8 The conception typically is that such a  
9 building has a lot of mass in it. But the key  
10 thing to keep in mind is the time constant of the  
11 building, which is how rapidly it responds to the  
12 climate outside.

13 Time constant is a function of  
14 resistance times capacitance, and just the fact  
15 that the Commission has been going to higher  
16 insulation levels, higher U value glass -- excuse  
17 me, lower U value glass, more reflective glass,  
18 that type of thing, you're radically increasing  
19 the resistance, the effective resistance of a  
20 house.

21 And actually the computer runs I've done  
22 in the past have indicated that I can basically  
23 achieve exactly the same effect of a high  
24 capacitance building by simply going to a high  
25 resistance building.

1                   And that type of building actually has  
2                   one advantage over a high mass building, and that  
3                   is particularly with a programmable thermostat,  
4                   you can change the temperature of the building.  
5                   If the building's unoccupied during the day then  
6                   there's no need necessary to try to keep it cool.  
7                   When you go to bed at night, a very high  
8                   capacitance building, whether you turn your heater  
9                   off or not, stays warm all night. A lower  
10                  capacitance building with a high R value doesn't  
11                  lose as much heat.

12                  And so I don't necessarily agree that  
13                  the Commission has gone away from passive  
14                  construction, because there's two ways to achieve  
15                  it. Again, time constant is resistance times  
16                  capacitance,  $E$  to the  $-1$  over  $RC$ .

17                  So, I've said it.

18                  MR. PENNINGTON: Thank you. Anyone  
19                  else? Yes.

20                  MR. HUNT: I'd like to make two  
21                  comments, Bill. The first is when we worked very  
22                  rigorously earlier this year on the adoption of  
23                  AB-970, and I think it's compliments to all  
24                  parties involved that it was done in a four-month  
25                  process, completed February 2nd.

1                   But as of today we still don't have the  
2                   residential manual in print for those of us who  
3                   are trying to actually implement the standards.  
4                   So, while we're already talking about 2005, I'm  
5                   very concerned that we still can't implement AB-  
6                   970, 2001.

7                   So we really like the thought process of  
8                   the Commission and the focus on implementation of  
9                   standards and enforcement of standards, it's a  
10                  little distressing to be talking already about all  
11                  these changes when we don't even have a book that  
12                  describes the existing changes that we have.

13                  And we anticipate that. We were told  
14                  last week at our board meeting in the next few  
15                  months. The standards are effective June 1st of  
16                  2001, which was a few months ago. And we'd like  
17                  to have the residential manual at its earliest  
18                  timeframe.

19                  The second comment I have has to do with  
20                  peak load savings. I wasn't going to make this  
21                  comment but Nehemiah brought up the savings of 155  
22                  megawatts in the chart here, which I thought was  
23                  very interesting, which is what we all tried to  
24                  achieved or claimed from the credit of AB-970.

25                  And then with some machinations it



1       actually got to be 198.7 megawatts, with PG&G's  
2       calculation.

3               It's very interesting, we tried to  
4       figure out what the peak load savings were with  
5       the Commission Staff, so that those of us in the  
6       building industry can then apply for innovative  
7       programs. We used the same math that was  
8       available to us from AB-970, or close to our  
9       approximation, because there was a lot of  
10      footnotes on that math.

11             And in doing so we proposed programs to  
12      the Commission for innovative reduction in peak  
13      load power. And the Commission's own staff said,  
14      no, those calculations aren't correct. What we  
15      have to do is discount them by at least 60 percent  
16      and come up with another number.

17             So between now and the process of  
18      getting to 2005 and our cost effectiveness  
19      analysis where we're running at a breakneck speed  
20      to be done by July of 2002, it would be nice to  
21      match the numbers of what one side of staff says  
22      monitoring and evaluation with another side of  
23      staff who says with energy efficiency, and come up  
24      with a realistic estimate.

25             Because what you're doing is driving

1 cost effectiveness. And if cost effectiveness is  
2 going to be driven by not only annual savings, but  
3 also peak load savings, we'd like to make those  
4 numbers as believable as possible.

5 So we'd like that resolved, and maybe  
6 you should revisit AB-970 first to kind of figure  
7 out what the actual savings were in the cost  
8 effectiveness of those standards, and then we can  
9 move from that juncture into 2005.

10 MR. PENNINGTON: Okay.

11 MR. FERNSTROM: Gary Fernstrom, PG&E.  
12 Well, Mike, were the calculations that you did  
13 just residential calculations, or both residential  
14 and commercial?

15 MR. HUNT: We tried to mimic the  
16 residential calculations.

17 MR. FERNSTROM: The reason I ask is  
18 because the load factor is higher commercially,  
19 more hours of operation. So you might get a  
20 different demand reduction estimate if you include  
21 commercial savings in the calculation as opposed  
22 to just residential.

23 MR. HUNT: Right. We just tried to  
24 mimic residential, Gary.

25 MR. PENNINGTON: Did you have another

1 comment, sir? No, okay.

2 Okay, well thank you very much. The  
3 desire of the Commission is that if you have  
4 specific proposals for changes that you complete  
5 the templates and submit those by the 5th of  
6 November. And we'll be reviewing those at the  
7 15th and 16th workshops.

8 So, thank you very much.

9 MR. ELEY: Thank you.

10 (Whereupon, at 4:40 p.m., the workshop  
11 was concluded.)

12 --o0o--

13

14

15

16

17

18

19

20

21

22

23

24

25

## CERTIFICATE OF REPORTER

I, JAMES RAMOS, an Electronic Reporter, do hereby certify that I am a disinterested person herein; that I recorded the foregoing California Energy Commission Workshop; that it was thereafter transcribed into typewriting.

I further certify that I am not of counsel or attorney for any of the parties to said workshop, nor in any way interested in outcome of said workshop.

IN WITNESS WHEREOF, I have hereunto set my hand this 26th day of October, 2001.

JAMES RAMOS

PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345